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CW Photo by V.J. Farmer

The Phoenix rises at the NCC in the form of Greyhound Computer Corp.'s enhanced 360/30 with 512K of storage.

IBM, Security Test Sites Vie on Software Strength

By Edward A. Bride
Of the CW Staff

NEW YORK – IBM and its test sites for its data security project disagree on the effectiveness of the Resource Security System (RSS), the software now being tested to protect operating systems.

Users can expect the first results of IBM's five-year, $40 million security study next spring.

By that time, tests will have been completed at four data centers, but some preliminary results were discussed during a session at NCC here last week.

The IBM RSS will cost users about 2% in overhead costs, it was suggested, but an official of one of the test centers said the security software degraded response time anywhere from eight to 25%.

William Mancina, manager of information processing operations at TRW, Inc., noted RSS is installed on two 370/145s at TRW, and is being installed on a third system.

Software 'Holes'

Two "holes" continue to exist in the software, but TRW has managed to plug 108 weak spots, Mancina related. Session chairman C.L. Foster of IBM disagreed with Mancina on whether RSS had in fact been "penetrated" as a result of the remaining holes.

In a later session, Peter Browne of State Farm Mutual said he was "a little disgusted in IBM," claiming RSS was designed in 1968 as an element in IBM's unsuccessful bid for the World Wide Military Command and Control System ("Wimmix").

Browne said State Farm wanted to use RSS, but IBM wouldn't make it available.

He claimed State Farm tried to get into the data security study, but for some unexplained reason it was not accepted by the IBM team, spearheaded by Foster.

While not addressing all Browne's complaints directly, Foster did admit RSS was developed for the Wimmix project, and that IBM had no plans to

(Continued on Page 2)

Software Makes Phoenix 30 Fly Past 370/125, Lessor Claims

By Ronald A. Frank
Of the CW Staff

NEW YORK – An independently enhanced IBM 360/30 with 512K of storage that is said to better the performance of a 370/125 by 370% was the largest mainframe system operating at the NCC last week.

Called the Phoenix System and demonstrated by Greyhound Computer Corp., the enhanced 360 included the Phoenix Operating System which can simulate the 370 DOS instruction set thereby providing users with 370-to-360 software interchangeability.

Accelerated 30

The Phoenix Model 30 was running with the recently announced 370-compatible version of Edos from The Computer Company. In addition, the 360 was equipped with the accelerator developed by Computer Hardware Consultants and Services.

The Phoenix System was introduced as a leased configuration available to Greyhound users. Although the exact hardware configuration of a Phoenix System will depend on user requirements, it will include independent tapes, disks and other peripherals as required.

The major portion of the storage of the system was supplied by CHCS. A larger version of the Phoenix system has been tested with 1M byte of storage, according to a Greyhound spokesman. The system on display also had Calcomp double-density 2319-equivalent disks, thus adding another 180M bytes. Other peripherals included four independent 3420-5-compatible tape drives, an IBM 1403 N1 printer and an IBM 2540 card read punch.

A Greyhound spokesman said the DOS version of the Phoenix Operating System was an upgrade of IBM's DOS release 26. The software lets users run 13,370 instructions that normally would not be compatible on the Model 30. The Edos software is said to enable the 360 user to operate up to six job partitions.

In addition to the 370-compatible DOS software, Greyhound said it plans to announce an OS version of the Phoenix Operating System for delivery in November 1973. The firm is also reportedly planning to introduce a second Phoenix system based on a 360/40.

(Continued on Page 2)

A Show of Superlatives

A CW Staff Roundup

NEW YORK – Convinced that their "new kind of meeting" was a success, officials of the American Federation of Information Processing Societies (Afips) have reaffirmed their decision to keep national computer conferences in the "population centers" of the country.

Walter L. Anderson, outgoing Afips president, said the decision to move away from the traditional "convention cities" into geographic (and therefore computer) population centers has made the National Computer Conference (NCC) a gathering place for all segments of the data processing community.

A record 100-plus technical sessions, a record five-day con-

(Continued on Page 2)

What Might Have Been

Did the computer industry "blow it" in 1958 and 1964? Panelists agree the infant industry was plagued by missed opportunities – failure to join the Algol bandwagon, IBM's failure to take advantage of the state-of-the-art . . . Page 3

More Power to Users

Performance capability increase is not linear with computer speed improvement, Dr. Herbert J. Grosch says. And top management is to blame for lost power.

On the Inside This Week

User Increased Throughput 20% With Key-to-Disk – *Page 31*

Independent Audio Response Has Communications Feature – *Page 25*

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★ NCC at a Glance ★

The users are thus being hoodwinked by vendors and should demand access to the increased power of computers. Page 7

'Stand and Revolt!'

"It's time users demanded what they want . . . We need to standardize the prices." And with that declaration Cmdr. Grace Hopper set the stage for a user revolution to demand that vendors pay more attention to standardization. Page 9

Is Fraud Solvable?

The only visible solution to the prevention of computer-assisted fraud is an all-out effort toward mutual DP official/auditor trust and cooperation. In fact, the DP manager should assume the role of the auditor, while the auditor walks through the computer process. Page 10

'Be Pragmatic' First

Modeling is an effective tool but should be used only after a pragmatic consideration of the value of the output, a session on performance evaluation was told. A preliminary study of the hardware system reliability is necessary because models can only provide approximate answers, not absolutes. Page 11

The Data Explosion

"We gather more information, so we can build larger and more accurate models, so we can get more output, so we can get more information." The data explosion can make DPers crave larger, more sophisticated systems than they need. Instead, systems builders should work harder to pinpoint and cut out unnecessary data. That's one man's assessment of DP and its future. Page 12

What's Really New?

In the previous Joint exhibits new products usually meant new techniques. But not at the NCC. The Exposition floor was marked by a definite lack of products promising new techniques. There were no new systems from major mainframers and much of the equipment shown included enhancements for present systems. Is the industry in a period of stabilization? Page 14.

Hart Warns Industry

The computer industry is now at a crossroads. It must either be restructured or face direct government regulation, Sen. Philip Hart (D-Mich.) told the keynote session. Hart also suggested the best remedy to rejuvenate the free enterprise system: "A very large dose of antitrust." Page 41

Protecting Software

Computer software needs protection but perhaps the current three forms – patent, copyright, trade secret – should be forgotten. Maybe what is needed is new legislation reflecting a new approach. And users and lawyers could be the prime means to carry it off. Page 47 .

A 'Capital' Adventure

Entrepreneurial endeavors are not for everyone, but for those with "strong egos, dogmatic confidence and dogged determination" there is capital, though limited, to be had. Would-be entrepreneurs would do well to heed the hard advice of some experienced venture capitalists. Page 54

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IBM and Its Security Test Sites At Odds Over Software Being Tested

(Continued from Page 1)

make it available as a product or free package.

Too Technical?

Richard Mills of First National City Bank suggested the discussion on security was too technically oriented, and should instead focus on auditing, planning, monitoring and physical controls.

"Are we building steel doors in paper walls?" he asked.

Several panel members during three security sessions agreed that 100% security is an unattainable goal, and that a major task facing users is knowing how much security they need and how much they should spend for it.

They also agreed with Dr. Edwin Golding of the U.S. Treasury Department, who stated the "weakest link in the most secure system" is the one person who can be compromised.

He also said computer users are finally getting concerned over data security, but this is a recent phenomenon.

"Up until recently, decision makers were only concerned with operational considerations," and not with security, he noted.

Hilda Faust, of the National Security Agency said current developments in operating systems were "cleaning up" the security "mess," and the "future is promising."

Accepting the fact that 100% security is impossible, she said admitting the security problems exist is a "giant step" toward solving it. Minimizing damage is the proper approach, since she implied that some type of data security damage is inevitable in some systems.

Other panelists later agreed that if a system is deemed 100% secure, that only means that insufficient effort was applied to the testing.

Standing Room Only

The three security sessions drew standing-room crowds to rooms set for around 300 people, with the biggest attendance at the IBM Interim Report on the data security sites.

Foster related that RSS was installed at all of the sites in an operational mode, rather than a test or research environment. The four sites, in other words, are actually operating with RSS installed under OS/MVT on 370 computers.

Foster said the four sites would conclude their studies early in 1974, after which reports would be published. Actual data, however, will remain IBM property, and the reports are expected to be summations.

There were no details on the next steps in the five-year data security project.

As part of the study, the IBM Federal Systems Center in Gaithersburg, Md., which was not represented on the panel, is examining the security problem from the manager's point of view, Foster said.

One element of its interest is the "trauma" of bringing in a secure operating system (such as RSS), and of the transition from a non-secure to a secure environment, Foster said.

However, Robert H. Scott, director of information processing services at MIT, noted that very few of his system's users noticed that RSS had been installed at MIT.

MIT's area of specialization in the study is the problem of authorizing users to access data, including identification of users and terminals on the system.

The state of Illinois is looking at economic trade-offs.

Precautions Listed

TRW's Mancina identified five concepts or categories of security precautions for a computer system:

- Integrity – Does the system do exactly what it purports to do, and no more? Does it run error-free?
- Isolation (Compartmentalization) – Is the operating system completely tamperproof, and can separation of "compartments" in the system help assure this?
- Controlled access – What are the rules for access? Are they enforced at all times? Is access policy consistent?

And there were several security checklists offered at the three-day sessions.

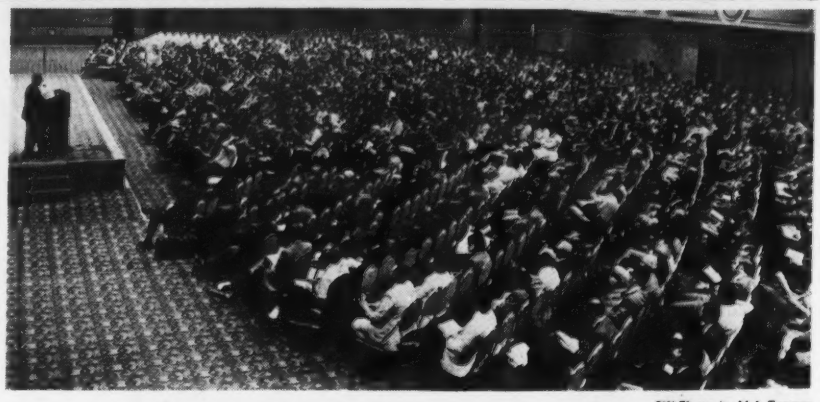
- Identification – Are users uniquely identified? What are the procedures for authenticating this identification?
- Surveillance – When is security violated? Are there alarm procedures to alert managers? Does the system terminate an "offending" program?

Among the other checklists provided Browne of State Farm Mutual suggested users and manufacturers both have responsibilities in solving data security problems.

The user responsibilities include:

- Awareness (recognizing that a security problem exists).
- Risk Management (identifying threats, costing them out).
- Management control.
- Physical security (including backup and personnel procedures).
- Auditing.

The manufacturers, Browne said, must make reliable systems, with access control (identification and authentication) plus audit mechanism.



CW Photo by V.J. Farmer

Sen. Hart addresses keynote session. Story on Page 41

CW Photo by Edward J. Bride

Mancina

Faust

Mills

Browne

Foster

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NCC—a Conference of Firsts and Superlatives

(Continued from Page 1)

ference with a record 35 exhibit hours and an upturn in exhibiting companies all combined for a near-record total attendance of 33,000 for a national DP show, Afips reported.

With these superlatives as the rule rather than the exception, Anderson hailed NCC as a "new kind of meeting," recalling that this first of the annual conferences necessitated a tripling of staff activity.

Attendees were often faced with choosing among nine concurrent panel or conference sessions, almost twice the number at the recent Joint Computer Conferences.

Standing-room-only crowds were common during the technical program, which was split between the New York Hilton and Americana hotels, while the 620-booth exposition was held at the New York Coliseum.

Many panel moderators and participants actually took part in two or three sessions, leading to some duplication within the technical program. Nonetheless, most sessions held their audiences to the end of the allotted time, and attendees complemented panel members who became involved in audience interchange.

A few panelists continued the old tradition of reading their papers directly from the *Proceedings,* but this practice appears to be diminishing, making actual attendance more critical for an active DP professional, other users reported.

While there was a lot of new product activity on the floor, it was concentrated primarily on the idea of improving price/performance – an increasing user interest – and less on technology than in the past.

Among the myriad product announcements, few if any employed daring advances in the technology, as exhibitors basically filled in product lines and offered the users more attractively priced units than before.

In the technical session area the subjects ranged from improving performance of computer installations to social issues and new technological developments.

But the primary emphasis here was on improved performance also, and the sessions devoted to helping the user become more efficient and effective drew the largest turnouts.

Phoenix 360/30 'Outstrips' 370

(Continued from Page 1)

In addition to the 370/125 comparison, Greyhound has run a benchmark comparing the Model 30 Phoenix with a DOS 145 system from IBM. The 145 included 384K of 30 msec storage, while the Phoenix System operated with 2314-equivalent 75 msec disks. The same job mix that took 88.9 minutes to run on the 145 took 74 minutes on the Phoenix, Greyhound said.

The Phoenix configuration demonstrated will cost about $12,500/mo on a three-year gross operating lease. Under terms of the lease contract, Greyhound provides 24-hour maintenance through Comma Corp., and pays all required property taxes.

Three users have reportedly ordered the Phoenix System and the first delivery is scheduled for this month, the firm said. The company is at the Greyhound Tower, Phoenix, Ariz. 85077.

HIS Software in Trouble?

NEW YORK – Software problems are reportedly delaying the P-Series computer systems scheduled for introduction this year by Honeywell.

The first machines in the new series reportedly will fill the low end of the existing HIS equipment line. The byte-oriented virtual storage systems will provide full emulation of the existing 200 and 2000 series. They are being designed and will be supplied by Honeywell's Bull affiliate in France.

Called 'Turning Point' in History

Algol Development in '58 a Missed Chance for U.S.

By Don Leavitt
Of the CW Staff

NEW YORK – The failure of the U.S. computing community in 1958 to join in the development of Algol was one of the major missed opportunities in the 25 years of software development, according to Robert W. Bemer of Honeywell.

Speaking to an NCC session on computer history, the long-time advocate of standards explained that the block structure of Algol would have avoided most of the problems that have been caused by trying to apply "notoriously indefinite" English – notably in Cobol – to solving logical problems.

Today, both U.S. and overseas users spend between $12 billion and $14 billion each year on software. "We just don't build it right, and we can't, with current languages," he added.

Prof. Saul Rosen of Purdue agreed that Algol was a missed opportunity, but in a different way than Bemer had suggested. The U.S. didn't realize Fortran was going to catch on the way it did, he explained, and it didn't realize it could be extended and developed into an Algol-like system, he claimed.

PL/I has been developed fairly recently as an attempt to combine the features of both Fortran and Algol, but typically this "universal" language is not a replacement for either, but a totally new effort. That is symptomatic of the whole DP field, he added.

In 1964, he said, a speaker at one of the Joint Computer Conferences noted the field had grown so explosively that it had been necessary to start whole new projects even before the older ones had been understood or fully exploited. Unfortunately, Rosen commented, the situation is just as true today.

Also in 1964 IBM announced the 360 and so it has to be considered the Year of Opportunity Missed, he continued. Even then, the field had developed far beyond the 360 and the software that eventually became OS, and IBM's failure to stick with the state of the art killed any real impetus to further advancement in software, he claimed.

What Might Have Been

Cmdr. Grace Hopper had a different viewpoint. She told the panel the real problem – in the past, now, and probably in the future – is a "human allergy to change." The idea that "we've always done it that way" is ridiculous in an industry only 25 years old, she said, but it pervades the whole scene.

Looking back doesn't do much good; there haven't been many new ideas since 1954, she continued. Instead, now is the time for users to take charge of the future.

They've got to stand on their own two feet and tell the vendors – hardware and software – what they really need. She urged and begged users to take part in standardization efforts, such as Codasyl.

In addition, she said, research and development are needed in data processing not just in programming languages, but in the study of how data is formatted, created and stored for the most effective use.

Ray of Optimism

Prof. Maurice Wilkes, director of the computer center at Cambridge University, was somewhat more optimistic than the other panelists. He felt the DP community had seized more opportunities than it had missed.

He noted, for example, that developers had broken away from machine-level code and into high-level languages and operating systems, even though some had felt it was "ill-advised, maybe even immoral," to use anything but octal (or binary) machine programming.

He claimed he had discovered the concept of debugging stored programs, but added such an accomplishment is comparable to discovering the Atlantic Ocean. "If you're not careful," he explained, "you'll fall in [and drown]."

He agreed with others that Cobol standardization may have come too early, but in his view it is an "aggressive type of standard" that allows changes to be made, so there is hope. "We are in a period of transition," he concluded, and programming languages are still in their infancy.

Businessmen, Inmates Mated

DOUGLAS COUNTY, Neb. – Computers have long been playing Cupid for hopeful lads and lasses, and now they are turning their matching instincts to prisoner rehabilitation.

County Commissioner George Buglewicz said computers may be used to match businessmen volunteers from the county with jailed prisoners, according to their interests.

"The businessman would try to be a close friend to the prisoner," said Buglewicz, "writing him letters, visiting him and helping him find a job when he is released."

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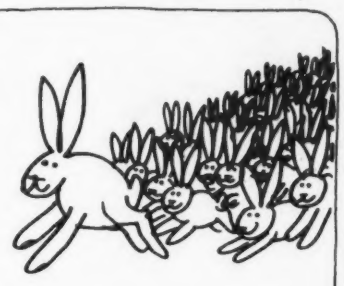
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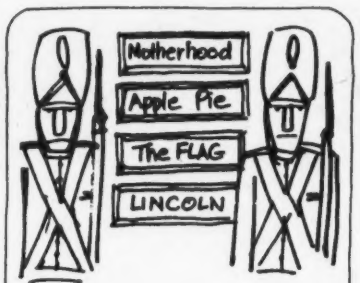

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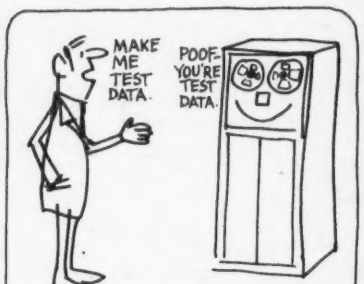

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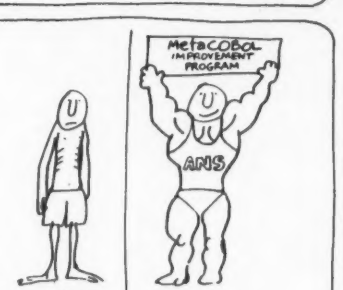

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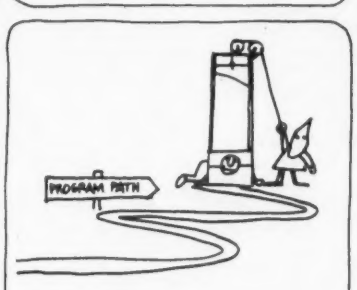
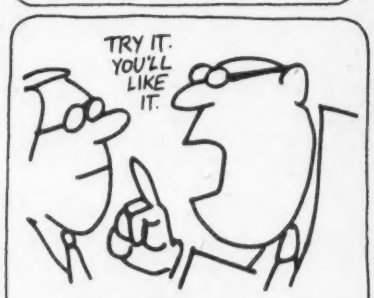


Documents COBOL program path execution.



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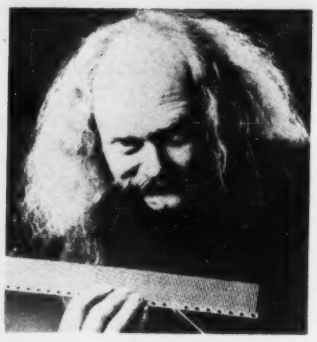

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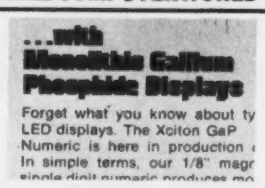
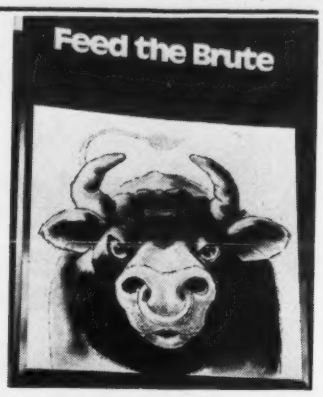
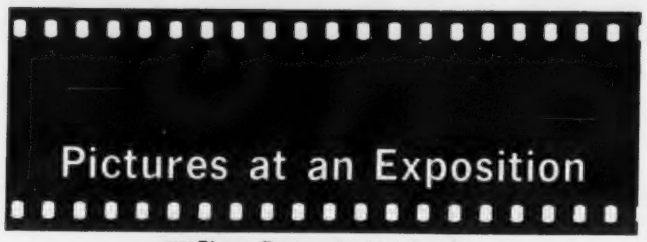






CW Photo Feature by V.J. Farmer

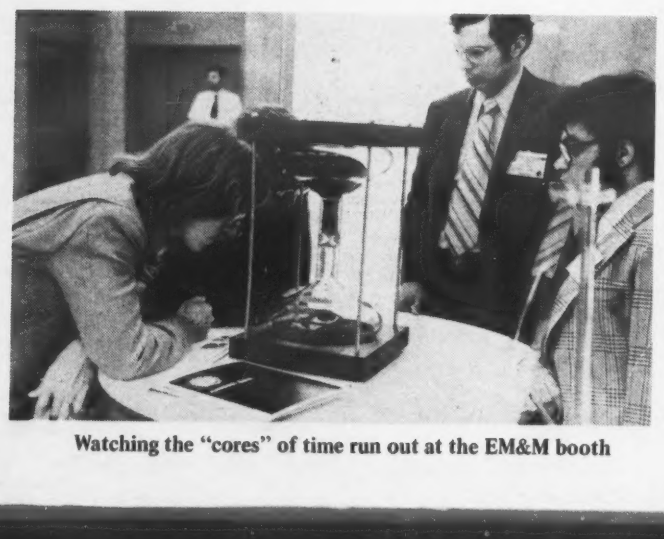
Avis shows off its Wizard.

Attendees work over the Data General T/S System.

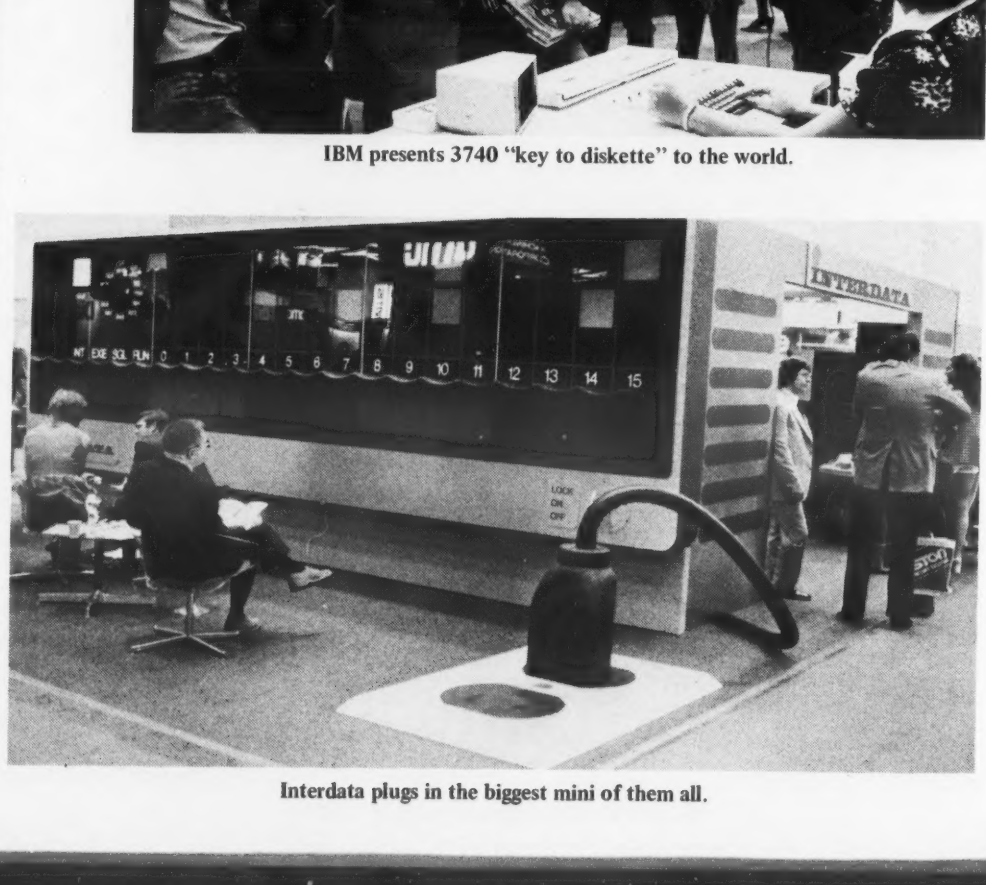
Draft was available on the floor.

DEC devotees interactively dock spacecraft on the GT40.

IBM presents 3740 "key to diskette" to the world.



Watching the "cores" of time run out at the EM&M booth



Interdata plugs in the biggest mini of them all.

Grosch Wants Users to Campaign for More DP Power

By Molly Upton
Of the CW Staff

NEW YORK – Users should play a larger role in demanding access to the increased power of computers, Dr. Herbert J. Grosch, senior research fellow of the National Bureau of Standards, told attendees of an NCC session on "Resource Utilization in the Computing Community."

Pressure should be applied on IBM by a gathering of sophisticated users at the chairman-of-the-board level, outlining to the other vendors what they want in the way of hardware capability, Grosch suggested. "Other companies are prepared to build the type of machine we want but are not prepared to sell it.

"IBM will get the word indirectly and be around pronto to call on those users asking for more powerful systems," he said.

Grosch said that for every measure of improvement in computer speed, performance capability is only increased by one half that amount. "It still takes a morning to run a payroll!" he exclaimed.

He blamed the lost power on laxity of top management, purposeful gameplaying of the profession and "sinister" vendors.

"You can't blame the vendors for maximizing profits . . . . . In the last 10 years it has become obvious to the sophisticated vendor that inefficiency pays off. If they let the power of the computer out to the user, people would turn back machines at a great rate. The number of machines manufactured would drop to zilch," he said.

The profession should have helped alert top management to the reality of trade, and fought against the interposition of factors that prevent user access to this computing power, but "it was fun" keeping up with new operating systems, he noted.

New Resource on Horizon?

Grosch sees IBM coming out with a radically different series of machines in April 1976, which will "crush the last three competitors that are vigorously alive – Univac, Honeywell and a major Japanese combination."

Session chairman Herbert S. Bright of Computation Planning Inc. noted disapprovingly, however, that users seem to be more concerned with system utilization than with throughput.

A key element in improving throughput is management control, observed Thomas E. Bell of the Rand Corp. "It is surprising how concerned with performance people become after they lose their jobs if they exceed their allocation of run time."

Bell outlined several tools for improving throughput, including personal inspection of the center's operation, accounting systems, monitors, benchmarks and performance modeling.

He said their effectiveness varies with the individual situation. "Two tools are better than one," he stressed.

For instance, in general control, accounting systems are the "classic" method used to detect areas for potential improvement. After one suspects the culprit, perhaps through the use of a monitor, this hypothesis should be tested.

Benchmarks Underused

Benchmarks are probably underused at this stage, he noted, while modeling is potentially dangerous as the assumptions need checking.

In deciding on an equipment change, benchmarks as well as modeling are the classic methods.

But how does one determine the size of the machine required? Bell said none of the tools is adequate, but "we don't know anything better." Often the user cannot give a succinct description of the desired capability or even projected workload for the machine, he said.

Interactive Display 'Not Good Enough' Without Graphics

By Toni Wiseman
Of the CW Staff

NEW YORK – "Communication by typing or display is not good enough. A physician should also be able to express his ideas graphically," said Wolfgang K. Giloi, at the NCC session on interactive computing.

"What we have tried to do is develop a low-cost, but flexible system using standard devices which can combine text and computer graphics," said Giloi of the Department of Computer, Information and Control Science, University of Minnesota, explaining the interactive display system he has helped develop for implementation in German hospitals.

Graphic or pictorial representation will serve not only as a convenient medium of communication between system users, but will also provide a means of expressing findings in a most precise way to the computer for further processing and evaluation, according to Giloi.

Such a system, he noted, must include a means of conveying photographic pictorial information – primarily X-rays – to the computer if it is to be a universal graphic communication medium.

The problem of automatic picture information processing and pattern recognition by computers is still far from being solved, said Giloi. He proposed the superimposition of video pictures and computer graphics on the display screen as a viable solution. A light pen would then provide the means of generating and manipulating the graphics interactively, he said.

Giloi advocated the use of dot graphics because they permit representation of line drawings, curved contours and even solid areas. The major drawback of this system, he said, is the excessive transmission time required for information exchange between the terminal and the computer if the content of all memory cells is transmitted and only a low-speed data link is available.

"Therefore," he added, "the resolution of the dot raster should be kept to what is absolutely necessary for a satisfactory performance. In the system we developed, we chose a matrix of 256 x 192 dots, resulting in a memory capacity of 48K bits."

Giloi presented several medical applications as examples of this type of system. Among these was the German Amanda report generation system in which the display consists of a list of symptoms combined with a drawing of the body area in which an "area of complaint" has been marked. Using the light pen, the physician is able to communicate topological facts in an unambiguous fashion, he said.

Other areas of application, according to Giloi, include report generation systems for allergic reactions, evaluation of X-rays, and evaluation of angiographic pictures.

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Panorama of the main portion of the second floor of the NCC exhibition at the coliseum.

Panelists Suggest Team Approach

Good Software Merges User, Programmer Interests

By Don Leavitt
Of the CW Staff

NEW YORK – A deep appreciation of the requirements of the end-user and the psychological interests of the programming staff are both needed to improve most software production environments, panelists at an NCC session on software development agreed.

Panel chairman James Porter, vice-president of Equimatics Inc., noted that any generalized software must meet the needs of a given set of users with minimum or no changes and perform within the limits of a predefined set of boundaries. To do that, he noted, his company always tries to work with a carefully selected sponsor group.

With advice from this group, a DP staff can build software generalized enough to be useful to various end users yet precise enough to be reasonably efficient, Porter explained.

Well-Defined Standards

Programs should follow well-defined standards and this will control the technical aesthetic or "cute" programmer. The standards need not extend beyond the individual development staff, he noted, but they must be enforced to be useful.

This requires talented people who must be well-organized and well-motivated, Porter concluded. And that means, Prof. Gerald M. Weinberg of the School of Advanced Technology continued, that the programming staff must be used as a team.

Such a team represents a programming tool that is effectively greater than the sum of its parts, provided they share their thinking and openly review each other's coding at all steps of the project development.

This egoless programming approach serves to stimulate the individual's effort when otherwise he feels unable to progress, but it also makes him more aware of the cost of his work relative to the whole project, since everyone knows where each worker is at all times.

Improved Productivity Possible

The improved productivity that is possible with the team approach is so dramatic that Weinberg normally will not tell his clients what he expects to accomplish. But tests have shown that costs can be cut by a factor of three when a team rather than individual programmers tackles a job. And the number of errors diminishes by a factor of 10, he said.

Those enhancements are too rich for many managers to believe, and he usually never claims more than a possibility of a 20% improvement. That, the DP manager can "sell" to his management where the more accurate potential savings are unbelievable, Weinberg said.

The Giant's Technique

Steve Lucas, manager of IBM's Medical Applications Group, outlined the giant corporation's software development cycle, including specific efforts to interface with users to determine their needs, and the growing use of advanced programming techniques.

The "chief programmer teams" have designated leaders but in operation are as egoless as Weinberg's teams, he said, with considerable interaction in problem-solving.

One Step Beyond . . .

Beyond that, however, they use structured program logic to define what is to be coded, and "top-down" programming to convert the design into executable code. And they use an automated library system as a report and control system for the entire effort so that all members know the current status of the project and of the individual programmer tasks within the projects.

Structured programming, Lucas explained, limits the number of types of operations that can be included, largely to eliminate as many GO TOs as possible. Top-down programming requires coding from the grossest level down to the finest, always building on code that had been previously written and tested.

By the time the final, detailed code is written and tested, the entire system is tested and there is no separate, often devastating, intergration effort of independent programs.

The chief programmer writes the most technically critical code and gives assignments to supporting programmers. They in turn are able to devote themselves to programming because a librarian or team secretary handles all clerical chores, from arranging keypunching of code, to getting compilations and test runs done and back to the programmer.

Centralization Seen Best Way To Reduce State DP Expenses

By E. Drake Lundell Jr.
Of the CW Staff

NEW YORK – The only real way to reduce costs of computing for state governments is through some form of centralization, since that is the best way to reduce the people costs associated with data processing, according to Glenn Goodman from the office of the governor in the state of Michigan.

But he noted it is hard to centralize operations because a lot of state agencies have a "vested interest" in keeping their own computer systems and sometimes the centralizers run into political problems in carrying out their goals.

At an NCC session on "Five Year Plans for Computers in State Government," Goodman explained his state's plan for the centralization of hardware and personnel along functional lines, i.e. one computer center specializing in such things as health and welfare, criminal justice, regulatory and licensing matters, engineering and education.

By having the people – primarily programmers – specialize in one area, they are better able to develop an expertise for the subject, he said.

But while the state has developed a modular system based around the different functional areas, he said it is important to have some type of centralized planning, and noted that the full five year plan calls for interconnecting the various functional centers.

"Statewide management information systems depend on standards and policy directions. You have to have someone with central authority in these areas," he told the group.

Program Fragmentation

John Gentile, now assistant U.S. Postmaster General and formerly with the state of Illinois, noted that a problem in many states was one of program fragmentation between the various departments and offices using computers.

Centralization of computer services can help the state get better control over its operations, he said, or could at least serve as a catalyst to get people to think more about the problems of consolidation.

There are several elements necessary for the implementation of any successful consolidation plan, he said, including support of the governor and the legislature.

In addition, the user has to understand what is happening and the central authority needs to have budgetary authority over the computer operations in the state.

To be successful, he said, the central system should spend a good deal of its time finding the elements in different programs that are transferable, and should introduce an efficient audit team into the computer operations of the state.

Technology Problems?

By a CW Staff Writer

NEW YORK – "The new information technologies will prove at least as important to mankind as did the printing technology of 500 years ago – both as a tool and, more importantly, as a catalyst for changing man's view of himself and his place in the universe," Lewis Branscomb, IBM's vice-president and chief scientist, told an NCC luncheon crowd.

Yet, he said, "learning the new lessons, mastering the information tools will be difficult and slow. It is not obvious that there is enough time" for man to apply them effectively to the problems that confront the world.

Used in Club of Rome Project

He noted these tools have been used in recent years to build global models, most notably in the Club of Rome project that led to the book *Limits of Growth* which predicted man would be the ultimate victim of his inability to control pollution and population problems.

On the other hand, he noted, similar studies based on different assumptions could lead to the opposite view that man will be able to control these problems through technology and therefore be able to increase his standard of living.

However, neither of these views is "independently verifiable," he said.

"Everyone seems to agree with the economists that the Club of Rome model is too simplistic to serve as a valid basis for predicting social phenomena.

"It cannot tell us whether to approach the future with confidence or dismay. The model is an interesting tool for quickly testing the mutual interdependences of stated variables whose coupling coefficients can be arbitrarily specified to correspond to any set of assumptions one might wish to make."

However, he said, the model has been helpful because it points out "the global character of phenomenology relevant to human survival" and the interdependence of these global variables.

Authority of Computer

But the interest stirred by the report was not so much due to the information contained in it, but rather that it had been done with the authority of the computer to back up the conclusions, he indicated.

"Can it be that the Club of Rome has struck a responsive chord in the public mind by featuring the most sophisticated product of modern technology as the instrument for predicting a dismal fate for man at his own hands – a kind of Promethean allegory?" he asked.

"It is significant," Branscomb said, "that this application of computer modeling seems to provide a sufficiently oversimplified common ground for looking at problems, that the narrow provincialism characteristic of specific cultures and nations is suppressed."

Branscomb noted that "attempts at simulation of global dynamics may never lead to useful predictions, but they may foster acceptance of the concept of Spaceship Earth, as Barbara Ward called it, which provides the boundary conditions for addressing the predicament of mankind."

Secondly he said "the ultimate terms for addressing the predicament are likely to display a great deal more diversity, human ingenuity and adaptability than the Club of Rome is counting on."

He added that mankind has the choice of whether to try to restrict technology in order to avoid any side effects it might bring or to use the technology to help improve the condition of the world.

Hopper Urges User Push To Gain Better Standards

By Molly Upton
Of the CW Staff

NEW YORK – Users should demand that vendors pay more attention to standardization, for the impetus will not come from the vendors, Cmdr. Grace Hopper told attendees at an NCC session on "Conversion Problems."

"It's time users demanded what they want," such as standard modules and a common data description language that would interface all modules, she urged.

Modular programs don't incur much overhead, are more apt to be written correctly and are easier to document and maintain, she added.

Well-Taken Advice

Echoing Hopper's recommendation that users should more actively outline their demands to manufacturers, one attendee suggested that the session move to the Control Data Corp. and IBM booths to demonstrate for stricter adherence to standards that would aid program transferability on the two firms' systems.

Hopper urged users to look ahead to radical changes and prepare for such events by implementing modular approaches to programming.

"Whatever computer you have is going out the door," she noted, and said probably by 1975 a computer on a chip for $100 would be available, and by 1980 a chip would cost from $1 to $10.

"The basis of all American industry is interchangeable parts . . . The effort to standardize big systems doesn't work . . . We need to standardize the pieces," she emphasized.

The need for standardization to avoid problems that are apt to occur during conversion was an underlying theme throughout the session.

Although people often talk of hardware and software conversion problems, a very real problem is with people, not only the operators of the program but the users of the system, noted chairperson Bonnie Dunning of the U.S. Military Personnel Center.

The question of how to make the user realize the increased effectiveness must be tackled, she urged.

Patrick Hoyt, in charge of the U.S. Army Personnel systems, said the reluctance of programmers and analysts to change may be partially overcome by breaking conversion into stages, such as conversion of programs and parallel operation, then the release of equipment, and finally the redesign and reprogramming to match features of the new system.

"Being forced to deal with the complexity of conversion adds stress to programmers, and anything to relieve this stress will help."

The importance of management involvement and standardization was illustrated by G.C. Durand, a vice-president of Southern Railways, which in six months converted from three IBM 7044s to two 360/65s and two 360/50s in 1969.

Three critical requirements, he said, are informed top management, strong DP management and a standardized shop.

"I advise people to keep abreast of standards development. Don't wait until standards are signed off until you start implementing," he said.

Use of DP in the Retail Industry Provides Plenty of Food for Thought

By Toni Wiseman
Of the CW Staff

NEW YORK – "Our business is planned ahead as far as a week from Thursday and our data processing is equally unsophisticated," according to Carroll D. Satterfield, director of corporate information systems for Fairmont Foods, as he described the DP activities of his company during an NCC session on "Data Processing Directions in the Retail Industry."

The session consisted of three case studies, representative of different segments of the industry. Satterfield's topic dealt with the role of DP in the convenience food business.

With sales amounting to $100 million a year, Fairmont installed its first computer last year to handle the same problems every small convenience store faces, according to Satterfield – inventory control and people. "We installed an inventory system to determine if vendors are overcharging, clients or personnel stealing or managers underselling."

Satterfield termed hi company's DP work as the "have your cake and eat it too" system. The objective is to build a strong utilization base to see the company through the "plateau" which all industries experience at one time, according to Satterfield.

"A DP failure would close us down more effectively than any strike or natural disaster," said Vernon L. Schatz, vice-president in charge of information systems for Jewel Company, Inc., in his discussion of DP trends in grocery stores.

Cash management and accounting, sales analysis, payables and control of direct delivery vendors and personnel accounting are the main problems faced by the industry, according to Schatz.

Schatz outlined the Electronic Store Information System (Esis), a minicomputer-based information network. "It isn't POS," he said, "because that is only one of its functions."

Esis centers around three minis – a master controller, an even terminal controller and an odd terminal controller – which are connected to POS terminals in the store and outlying terminals in branch stores.

The system, Schatz said, has numerous advantages, among them the ability to correct misrings, calculate taxes and change automatically and handle coupon refunds. Esis capabilities also extend to check verification and credit authorization; productivity item movement; cash information; and gross margin calculation by item or category.

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Auditor-DPer Cooperation 'Only Way' to Prevent Fraud

By Edward J. Bride
Of the CW Staff

NEW YORK – The only way to prevent computer-assisted frauds is through close cooperation between auditors and DP officials, according to several auditors at an NCC panel discussion.

Reeling from criticism surrounding the recent Equity Funding scandal, auditors called on their colleagues to participate in computer systems design, and demanded similar action from their DP counterparts.

Paul Ton, a consultant with Arthur Anderson & Co., said DP professionals should not try to "snow" internal auditors with DP jargon, but should encourage early involvement in the system design process.

"Walk [the auditor] through" the computer process, rather than attempting to impress the auditor with the expense of developing a financial system, Ton recommended.

One difficulty is the auditors' reluctance to accept "soft" input [video-terminal] devices instead of cards, but auditors should be convinced that this approach to input does not mean the data base is in a "shambles," Ton said.

Thomas Samson

CW Photos by Edward J. Bride

Paul Ton

The data processing manager should "assume the role of the auditor," Ton said. This would assure better systems design, and the communications between departments would reduce distrust, he suggested.

Defining the Problem

The session, attended by about 100 technically-oriented people and a few managers, was sparked by problem definition. Most of the panelists blamed lack of communications for weaknesses in accounting systems, with the Equity Funding problem seen as a general example of lack of controls.

Thomas Samson, partner with Arthur Young & Co., claimed DP managers, not auditors, are responsible for control procedures. While computers are highly accurate and reliable, he said, a "visible audit trail" is given low priority by DP managers and the audit effort is thus reduced in its effectiveness.

Ton encouraged DP technicians to ask auditors "what controls should I implement" in order to assure accounting security.

Noel Zakin, session chairman and an official of the American Institute of Certified Public Accountants, called the audience's attention to the AICPA's several projects to encourage this type of cooperation, but no solutions to the audit-trail problem, other than mutual trust and cooperation, were proposed.

'Policy Vacuum' in Washington

Panelists Push for Information Systems Standard

By Toni Wiseman
Of the CW Staff

NEW YORK – There is a need for a national standard on information systems, according to a consensus of panelists at the NCC session on "Knowledge Dissemination."

Canada, according to Charles Wilk, special assistant to the director of telecommunications, Department of Commerce, is the only nation so far which has such a standard.

Andrew Aines, of the National Bureau of Standards, said there is a "policy vacuum" in Washington, and that not enough attention is being given to the creation of standards for networks of the future and the internationalization of information. He advocated galvanizing industry, government and academia to create these standards.

Standard development will not be easy in Wilk's estimation. It will entail a review of industry problems, a willingness to make changes and a comprehensive analysis of obstacles.

"One obstacle is the fact that computer and communication technologies and the legal environment are ill-suited to jointly develop an information system, much less a standard," he said.

'Weeding Out' Process

Another point of panel agreement was the need for a "weeding out" process.

There is a large and growing information "sludge," said Lewis M. Branscomb, vice-president of IBM, "and information technology, by reducing the cost of storing useless information, is going to make the problem worse before it makes it better."

In order to alleviate one area of "sludge," the National Library of Medicine (NLM) data base contains only articles published within four years of the current date, since, according to NLM deputy director Melvin S. Day, they have found that most information requests are filled from material originating from only half the journals indexed and from issues within the past four years.

Stephen Rossmassler, area program manager for the National Bureau of Standards, said the conventional approach to information retrieval consists of three steps: you tell us what you want, we'll give you what we have and you pick out what you want.

Today, this system can overwhelm any user because the volume of available technical literature is so great that information becomes "unavailable" due to its bulk, the NBS representative said. He pointed out the total backlog of technical literature, from 1800 to 1972, is 15 million articles, with a current annual input of 2 million.

Specialized Data Centers?

Though all agreed that an interdisciplinary network was the ultimate goal, from a short-range viewpoint specialized data centers are the only answer to the problem of evaluating and retrieving information, according to Branscomb.

"The essential criterion for the selection of data base documents is that they be relevant to a specific area," Rossmassler said.

Branscomb noted the distribution function for error must have well-understood bounds if important decisions are going to be based on the data. "The value of information depends on the economic leverage of the issue multiplied by the likelihood of the information affecting the decision outcome," he said.

Rossmassler summed up the session by categorizing the development of an interdisciplinary knowledge dissemination system as a three-way challenge:

First, the information analysis centers must develop communication links and networks; second, the various discipline-oriented workers must evaluate all information in their fields to ensure that non-specialists receive reliable information; and last, the computer/systems workers must develop an automated system capable of retrieving and delivering information by means of a jargon-free vocabulary access system.

Computer Has Green Thumb

STORRS, Conn. – If you want a more luxurious lawn and more plentiful crops this year, you might want to contact the Plant Science computer at the University of Connecticut here.

Dr. Gary F. Griffin, an agronomist with the University's Plant Science Department, has written two programs to help people deal with most types of soil problem. The first program is designed for lawns and vegetables, the second for agronomic crops such as silage corn, alfalfa and hay.

The computer is fed punched cards containing the person's name; the plant crop in question; and soil test results such as soil texture, soil pH and the available levels of calcium, magnesium, phosphorous and potassium.

For agronomic crops, data also includes the yield goal, the kind and amount of manure which will be used for the crop, the amount of lime which has been applied to the soil within the last year and the month in which the test sample was made.

Based on this data, the program directs the computer to select or calculate the lime and fertilizer recommendations appropriate for the given crop.

What Is the IQ of Your Intelligent Terminal?

By Peggy Zientara
Of the CW Staff

NEW YORK – Intelligent terminals categorized in "ascending order of intelligence" set the format of an NCC session chaired by Ira W. Cotton of the National Bureau of Standards (NBS).

Zane Thornton, deputy director of the Institute of Science and Technology of NBS, opened the session with a discussion of the "dumb" point-of-sale terminal used in retail applications.

There are three-and-a-half million electronic cash registers in service now, and up to 170,000 POS terminals worth $250 million are expected to be in use by 1975, according to Thornton.

Thornton cited the main advantages of POS terminals as their design for retail work; their resemblance to cash registers which they replace; and operability by laymen.

Uniformity Needed

"Retail industries must get ready for these terminals by developing uniform identification codes and representations," Thornton said.

Two efforts in grocery and retail merchandising included the Universal Product Code (UPC) which was established in April of this year. The code consists of 10 digits, the first five designating the manufacturer and the last five designating the individual item. The National Retail Merchandisers Association in 1967 set up committees to decide standard procedures for code specifications. A major difference between the grocery and merchandise business, as far as codes go, is that the grocery inventory consists of 20,000 individual items while the merchandise inventory can be 70,000 to 80,000 items. The grocery code needs only 10 digits and the merchandise needs over 30 characters for such information as color, style, price and manufacturer. rs.

Gone to POTs?

Douglas Engelbart, director of the augmentation center at Stanford Research Institute, discussed what he called "point-of-thought" terminals. These terminals are useful in what Engelbart terms the "core workshop," where one does one's "knowledge work" by studying, writing, taking notes, etc.

Stanford's NLS on-line collaborating system uses a hand-held "mouse" which can indicate all the characters of a keyboard with one hand (the "what") while the other hand indicates the "where."

"Use of the mouse allows easy postural shifts, works with video and remote slave displays, enables control of separate cursors and stays put for quick, easy access," according to Engelbart. It further allows extended dialog between people in a variety of modes: telephone dialog, telegraph mode (Tenex "send-message") and recorded dialog. Two people in distant cities can reference the same display simultaneously.

Andries van Dam, professor of applied mathematics at Brown University, defined "intelligence" as the ability to do things locally. He distinguished between a terminal as having a fixed function and a satellite as having "a life of its own," being usable, accessible and easily user-programmable.

Van Dam finds the advantages of local intelligence are improved response time for simple tasks, dependence on the terminal with no use of interaction and, ideally, the ability to handle more than 50% of simple functions locally, viewing the intelligent terminal as a "fancy peripheral."

Problem areas in putting the emphasis on peripherals as opposed to central hardware are:

- The difference between hardware "off-the-shelf" vs customization.
- The difficulty in interfacing a hard-wired interface to a communications line.
- Operating system and programming language support.

"Critical intelligence may be defined as enough local 'oomph' to do what you want to do," van Dam said. "Most existent sytems are below critical intelligence, and microprogramming is a vehicle for this intelligence."

The components of the sophisticated system are a high-level language, a compile-time post-processor and a run-time environment.

The problems are to make it work and to determine whether the overhead for the "division of labor" is worth it.

'Fine-Tune' Your Operators

Modeling Can Be Useful, But 'Be Pragmatic' First

By Don Leavitt
Of the CW Staff

NEW YORK – Modeling can be extremely useful even when applied to existing workloads, but it should only be used after more pragmatic considerations have been first weighed carefully, Professor Stephen R. Kimbleton of the University of Michigan told an NCC session on "Performance Evaluation and Measurement."

Before going into mathematical analysis, he said, users should be sure that the processing or the output of the application program really are needed, and if so, that all major jobs have been optimized. Users should be serious enough in the desire to get the most from the system to satisfy themselves that their operators are effective, he continued.

Hardware Reliable?

Fine-tuning the software won't accomplish anything significant if the operators aren't "fine-tuned" as well to do their jobs as efficiently as they can. By the same token, he added, the hardware system reliability has to be considered at a satisfactory level before the user can be sure how effective any modeling effort will be.

All this preliminary study is needed, Kimbleton said later, because even though there are a number of models available and many are good, they can only provide approximate answers. "You can't look for accuracy at the 1%, or even 5% level," he added, but noted that the earlier someone experienced in modeling joins the effort, the better.

Later in the session, James H. Burrows, associate director of data automation for the Air Force, added more evidence that pragmatic approaches can often bring system performance enhancements comparable to those available from many of the more sophisticated evaluation and measurement tools. The big problem in most DP shops, he said, is that the typical programmer has a tendency to be very conservative.

Program Expansion

He has trained for a long time, he noted, to keep programs small. But this is often a mistake. In one case, a program that had been limited – by definition – to 19K words on an Air Force Burroughs B3500, was rewritten and grew to 22K words. While this cost core, he noted, it reduced the number of overlay operations from more than 3,700 to just 18.

Programmers are perhaps most conservative in their setting up of blocking factors for files, Burrows continued. But simple blocking factor programs can often do as much good as extremely complex simulation efforts to determine the most effective factors.

In one test, he said, a program with unblocked files used 18,600 I/O accesses. When the files were blocked by a programmer based on his own best judgment, the number of accesses dropped to 5,000. A simulation study dropped the accesses further, to 3,560, but only at the cost of extensive work over several weeks.

A blocking factor program, used for half a day, gave almost exactly the same results, with I/O accesses reduced from the programmer's best effort (5,000) to 3,571, Burrows added.

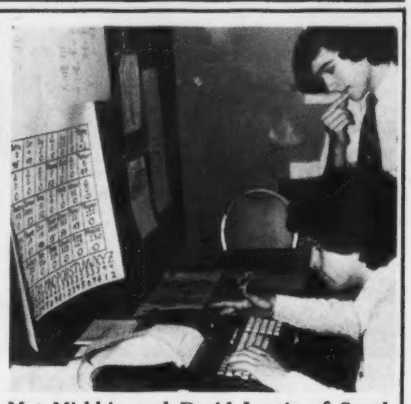
Probing the Problem

A different approach to the problem of efficiency, proposed at a recent ACM/NBS workshop on computer system performance evaluation, would entail distribution by mainframe vendors of a plug-like device that would provide access to at least basic "probe points" or impulse measurement points.

These plugs, according to Thomas Bell, staff member of the Rand Corp., might come in four levels of sophistication to suit different user needs. It would be up to the user, he said, to provide his own monitoring device to capture, and perhaps analyze, any data gathered from the probes built into such hardware vendor-provided plugs.

CW Photos by Mary Upton

J. Borenstein of James. A. Reynolds Jr. High, Brooklyn, figures population density and ocean salinity in the past and future.



Mat Mishkin and David Lustig of South Side High School, Rockville Center, N.Y., translate high-level language to machine language on their terminal linked to a HP 2116 from Time Share Corp.

Karl Danz of Smithtown High, E. Long Island, runs his "program for assistance in writing Basic" (it cuts out keystrokes).

Rosanne Gigancte of Bronx Science High runs a student-built computer of 16 memory words that took 30 students' lunch hours for two-and-a-half years.

Science Fair Comes to Town

The 55 exhibits in the high school science fair at the NCC included student works ranging from a shortened version of programming language to a computer built by students, as well as applications.

Robert W. Klein of Walt Whitman High School, Hungtington Station, New York, won first prize in the applications category, as well as best in show with an exhibit titled "Solar Eclipse" (11th grade).

Fred Kalena, Ridgewood High School, N.J., won in the category of design and/or construction of components or computers with his exhibit on "designing low-cost computer components."

In the programming area, Gary Weiss from Northeast High School, Philadelphia, won with his exhibit on computer-assisted instruction in Latin.

DP as Public Resource 'Going Too Slow'

By Molly Upton
Of the CW Staff

NEW YORK – The nation clearly needs to make greater use of its computing power for the public benefit, but progress toward this is not abundantly evident, according to reports from panelists at the NCC session on "Computer Technology as a Public Resource."

Whether the government will take an active role in this direction is not clear, as the budget crunch in Washington seems to have struck several areas that might have tackled the issue.

But panelists also had difficulty agreeing just how making computers more available to the public or increasing computerized services would be effected.

Edward E. David, formerly White House adviser on science and technology, said he sees society calling for applications of technology, and that information technology will become more problem-oriented, with increased standardization and regulation.

Both from a balance of payments view and from a foreign policy position, the U.S. resource of computing technology is becoming very valuable in effecting a stable state of affairs between the U.S. and other nations. "Computing technology is becoming the preferred currency in foreign affairs," he claimed.

Granger Morgan, director of the National Science Foundation's program on the impact of the computer on the individual, mentioned that his office is beginning to provide a feedback loop between research-oriented input and problem-oriented output.

Some of the problems highlighted by increased use of information systems are that frequently systems are based on how society should work, rather than how it does work.

Kenneth Katz, executive secretary for the Privacy and Computer Task Force in Canada, indicated his country has chosen the government to take a leading role in promoting exemplary use of computers rather than engage in heavy regulation.

Canada decided not to institute a single identifying number because it was felt that the measure was not worth the effort due to the public fear and resistance.

More Power to Public

Herbert Grosch, senior research fellow at the National Bureau of Standards, advocated setting up a federal agency responsible to the three branches of government to work for increased computing power for the public.

In this regard, it is up to the computing community to "take a step backwards toward professionalism" and help in this effort, he advised.

David disagreed with the central agency concept, but did endorse working through government channels, which he said can promote changes through incentives and create markets.

Ernest Baynard, a member of the Brooks committee that enacted legislation for use of computers in the government, outlined from the floor the difficulty of government officials and representatives in obtaining pertinent information for decisions about computers and governmental policy.

For instance, to obtain such an incentive break as mentioned by David, one needs access to someone in the Executive Branch to get action. "It's not a question of convincing people but of giving them a 50-50 chance to come to a right or proper decision where computing is involved."

Ecological Simulation Is 'Best' If Future Alternatives Are Given

By Toni Wiseman
Of the CW Staff

NEW YORK – "Simulation for ecological forecasting is best when it underlines alternatives for the future and allows for protection-oriented policy," noted Gene Tyndall during the NCC session on "Environmental Quality and the Computer."

Tyndall, chief of modeling and methodologies for the U.S. Environmental Protection Agency (EPA), explained that the agency's Strategic Environmental Assessment System (Seas) is a research project focusing on a means to forecast the long-range effects of societal actions, with a view to averting harmful environmental impact.

"The research plan revolves around our ability to synthesize the available state-of-the-art techniques and methods for assessing long-range comprehensive pollution problems," Tyndall said.

The Seas development process is an in-house/contractor effort, the EPA representative said, designed to take advantage of expert opinion to maximize the combined man-machine capabilities.

The project, according to Tyndall, faces numerous obstacles. The first critical issue is uncertainty; this includes technological trends and their impact on society.

Secondly, there is the issue of the interrelationship of factors, and the nature and degree of interaction. The deceptiveness of short-term considerations is yet another obstacle to forecasting, as is validation.

Seas is a time-phased project. The first phase includes test model development and operation, and prototype definition. Phase II will encompass prototype development, assessment of the state of the art and comprehensive system requirements. Comprehensive system development and policy applications are the final phase, slated for implementation in 1974.

The input factors for Seas are change agents, processes, residuals, effects, reactions and stocks. Change agents include population, economy, institutions and government. Extraction, production, distribution, consumption and disposal are process inputs.

Tyndall offered a summary of the objectives of Seas: "We want to get the right information to the right people at the right time for the least amount of money possible."

CW Photo by Ronald A. Frank

Lonely 145?

IBM hid this 370/145 in a small corner of the otherwise empty third floor of the Coliseum to back up its peripherals working directly below in a second-floor exhibit at the NCC.

Voice Answerback in Vogue

By Patrick Ward
Of the CW Staff

NEW YORK – Voice answerback control systems were heartily endorsed by users here in an NCC session on "Voice Answerback Comes of Age."

With a Touch-Tone phone or similar equipment as a terminal, panelists showed how practically anyone can dial a computer and then follow its instructions on what data to key-input.

Tom Fisher of IBM, the session chairman, set the stage for the session when he said, "Old objections to voice response systems that criticized poor audio quality and soft security defenses no longer apply." The users on his panel emphasized that audio quality and security were both satisfactory in their applications.

Edward Klemmer, a systems engineer at Bell Labs, pointed out that typical Touch-Tone users key in about 1.4 digit/sec with a relatively low error rate. Errors of omission are the most serious faults to watch for, Klemmer said.

Absolute Security

Security is not a problem for Robert H. Rogers of The City National Bank of Bridgeport, Conn. Rogers' bank handles 250,000 documents a day and "the security of information is absolute." Only bank phones can dial the computer, he said. Bank officers have a code for restricted information.

Tellers can use the system to find if it is alright to cash a check. If it is not, the computer tells them the actual balance. With this and the other information the computer provides, tellers can explain a situation to a customer, he said.

Before the answerback system, Rogers said, tellers had to call up a terminal operator whose line was often overloaded.

Once the system was installed, he said, customer handling efficiency rose sharply. Window lines went down and distrust between bank DP personnel and other employees also dropped.

Cost savings over on-line terminals were dramatic, Rogers added, because of the low cost of the telephone "terminals."

No Snap Decision

Tellers are trained in only 15 minutes to talk to the computer. Now tellers do not have to make snap judgments about a transaction because they cannot reach a computer, he said. And the phone lines to the computer have almost never become overburdened.

Voice answerback techniques are "invaluable for the salesmen" at Emery Air Freight, according to Andy Benkovich, the company's supervisor of analysis and programming.

Emery's computerized air cargo control system inputs 250,000 transactions each day through 200 terminals.

Since 1971 when audio-response from "the computer unit came on-line, salesmen can know where everything is." He demonstrated how they simply have to call up the system, get a response signal and then dial in the shipment number. The computer orally repeats the number, tells what is in the shipment, where it is at the time and when it is due at its destination.

American Honda also finds voice answerback communications a valuable sales tool.

The motorcycle and car importer has 10 distribution centers, Jeb Deane of the firm said, to service 310 auto and 1,800 motorcycle dealerships. Formerly critical parts orders were airmailed to California. It took about 15 to 20 days for the part to be delivered. With a computerized system using voice answerback response, the time is now five days.

How It Works

Users dial the computer, using their particular security code. The computer tells the caller whether the part is available, where it is located and asks the caller how he wants the part shipped and then confirms receipt of the order.

'Too Much Data'; Panelists Want to Stem the Growth

By Michael Weinstein
Of the CW Staff

NEW YORK – Computer people in the information science field are attacking the wrong problem, according to Dr. Jack Belzer, professor of information science at the University of Pittsburgh. More effort should be spent on trying to control the growth of large amounts of data instead of building larger more sophisticated systems, he told an NCC session on "Information Science – Promises, Realities and Futures."

Dr. Murray Turoff of the Office of Emergency Preparedness confirmed the feeling that information science is on the wrong track – "we gather more information, so we can build larger and more accurate models, so we can get more output, so we can get more information."

Ad Infinitum

The problem with information, the panelists agreed, is that it is a nonconsumable commodity. It grows endlessly and the system builders spend little time in deciding when and what data should be destroyed.

On another front, Dr. J.C. R. Licklider, professor of computer sciences at MIT, predicted marked social changes due to the increased use of computers as they become more accessible to the general public.

Licklider felt that every two years hardware capabilities double while during the same time costs decrease.

A prime example cited by Licklider was the new calculators costing between $50 and $500. "This cost puts them in the range of nearly everyone," he said.

But the real impact may be when the calculators develop more programmable capabilities and are used by schoolchildren.

Belzer felt this revolution may have the same sort of impact on society as the invention of movable type by Gutenberg.

In another area, Turoff postulated that intelligent terminals could be placed in public libraries. Persons could then use these devices to get information or counseling on a wide range of subjects.

It Is Here!

A user identifying himself as a faculty member of the University of Georgetown noted that the town of Reston, Va., already had installed a Touch-Tone online system in the homes of various citizens to allow for some interaction. Further, he noted the number of persons wanting to subscribe to the system was larger than the number of systems that could be supported.

This led to the question of when such systems – such as the wired city – could be expected to become a reality.

While the panelists understandably hedged at exact dates, Licklider felt that in about 10 years a large number of working people would work at desks that did include computer capabilities.

Dr. Anthony Oettinger of Harvard felt many people still had fears of a future society controlled by unthinking impersonal machines.

Many of the past books and projects, such as simulated intelligence, had done little to reinforce the idea that computers were not all-powerful entities, he added.

'Professional Approach Needed' 'Trained Manpower Lacking'

DP Voting – the Promise that Failed to Deliver

By Patrick Ward
Of the CW Staff

NEW YORK – Computer voting promises low cost, accurate elections, but in nine years it has often failed to deliver, panelists at an NCC session agreed.

And people, not computers, are the problem, they said.

"The technology is here," said James Farmer, an analyst for Systems Research, Inc. "What is required is a professional approach."

"The computer voting industry has failed. Witness Detroit, Washington and a few others," said Bob Varni, president of Computer Election Systems.

On the security question, Farmer said it is a myth to think fraud is technically impossible or that computer people would not commit it. He said he knows of two unprosecuted cases where fraud has occurred.

Farmer

Varni

W Photos by Edward J. Bride

Farmer had some recommendations on ways to counter fraud or errors.

First, voting programs should be certified by CDPs and candidates and political parties should have their own DPers inspect the software, he said.

Control totals should also be taken to detect errors, Farmer said. He pointed out that Los Angeles runs independent sample recounts on 20 precincts, and he favors similar procedures.

He also recommended that political parties have trained observers present at the ballot processing. However, he mentioned that the Democratic Party tried to train observers last year and found a lack of people familiar with both elections and computers.

Lastly, he suggested strong physical security measures at the computer center and the use of an independent audit if necessary.

But computer voting does have its rewards, according to Varni. He said Los Angeles County invested $5.6 million in equipment and then achieved $1 million in savings per election.

Farmer remarked that the Los Angeles savings may not be repeated in other communities. "People in Los Angeles are running the best elections in the country," Farmer said. He attributed the city's success to assigning five programmers to election work.

Farmer and Varni differed on what savings, if any, users could expect from computer voting systems. Varni said there almost always is a cost decrease. Farmer, less optimistic, said a study of his showed punched-card voting is only slightly less costly than manual counts and more expensive than mechanical voting machines.

However, Farmer said, punched-card voting's cost must come down as computing costs go down and labor costs rise.

Printouts Play Politics

NEW YORK – Computer printouts may one day be as common in political campaign headquarters as pictures of the candidate, two panelists at a session on "The Computer and the Elective Process" suggested.

Computer use really began in primaries where there was a need to reach specific voters, said Oren Teicher, who ran the DP operation for the McGovern campaign in California.

Computer systems used for the persuasion of voters are "enormously useful," Teicher said, "in that a well-put-together computer system allows a campaign to maximize man-hours."

Teicher recalled the staff of a New York congressman once spent 22,000 hours looking up two million phone numbers. In California, it took a computer 19 hours to merge 1.7 million phone numbers with voting lists..

Direct mailings can be useful for requests for money, polling samples or persuasion letters, said Wainwright Dawson, Jr., an independent political consultant.

To raise money, Dawson said, you turn to a list. A security problem arises here though, he said, because some of these lists can represent a lot of money.

Session chairman E. Drake Lundell Jr., *Computerworld's* Washington bureau chief, asked if the advent of the computer gave a big advantage to affluent candidates who can buy such lists.

Both Teicher and Dawson agreed it did, but Teicher said it could also help the struggling candidate reach a specific audience. As an example, he said computer mailing can be a great savings in an area where media use would have low cost-effectiveness.

Targeting can be a big help to candidates, "but there is no question the potential for misuse is massive," Teicher observed. It can be used to say one thing to one target group and just the opposite to another group, he said.

Bankers Conference Told

Future Systems Mean 'Heavy' Burden for DP Managers

By Don Leavitt
Of the CW Staff

CHICAGO – Manufacturers are moving "as fast as they can" to perfect what can "legitimately be termed a fourth generation of computer systems" and DP managers better be aware of what these entail and the impact they can have on their companies' management concepts, according to Frederic G. Withington, senior staff member of Arthur D. Little, Inc.

Withington spoke in a work session of the American Bankers Association National Operations and Automation Conference, held at the Palmer House last week. His remarks came shortly after the 1,400 attendees heard keynoter James F. English, chairman of the Connecticut Bank and Trust Co., warn that "an unusually heavy burden" will fall on DP managers since they are the people who must design and operate the systems banks need to compete in the future.

The mature fourth generation product, Withington said, will be oriented to central data bases, transaction (rather than batch) processing, and dynamic interaction with users. Demand among large users is "overwhelmingly" toward real-time, on-line processing that will require those characteristics, he said.

These characteristics indicate the new systems will be heavily centralized, even while they may also support distributed processing operations for a narrow range of services pertinent to the local division.

But, Withington warned, there are also some strong arguments against centralization, "It brings new costs of terminals, communications, larger computers and the like."

It may be hard to convince a skeptic that anticipated savings will prove greater than these new costs. The move toward centralization goes directly against the whole concept of delegation of authority and responsibility that is the key to many corporate organizations, he noted.

As a first and primary effort, he said, DP managers must establish corporate standards for data elements, languages and equipment. The main benefits of centralization "cannot be obtained until this is done," he explained.

Beyond that, he added, the central management must provide staff functions, such as training courses, that the division units will recognize as useful and better than they could develop for themselves.

And, "perhaps most important" in Withington's view, the company should rotate DP management between the divisions and the corporate staff.

"No one is more sympathetic to the other person's point of view than the person who has been there himself," he pointed out. Besides, if it is understood that advancement requires a successful tour of duty on each side of the fence, self-interest will induce people to avoid alienating those currently on the other side, he continued.

"General management must get much closer to its operations and automation management," English noted in his speech, in effect anticipating Withington's thoughts. "They are so dependent on them for guidance in overall planning and for rapid and economical execution" of the DP that the bank's financial performance "may well depend on the closeness and solidity of this relationship, he concluded.

New Products Offer Banks More Flexibility

By a CW Staff Writer

CHICAGO – The NCR 775 "proof and encoding" system introduced last week at the American Bankers Association automation conference includes a minicomputer and provides banks with flexibility and speed that have been virtually impossible with older systems, which were largely electromechanical in operation.

At the same conference, Burroughs brought out the C6203 desktop calculator, hardwired with nearly a dozen banking-oriented "applications," and Hewlett-Packard displayed the HP-45 advanced scientific pocket calculator, described as an enhanced version of the HP-35.

For its part, Honeywell showed for the first time in a major show the 7340 banking teller terminal and the 234-0 Micr reader/sorter, which can be used either on-line to the H200/2000 series CPUs or off-line as a stand-alone unit.

The mini within the NCR 775 enables users to enter "any number of encoded digits a bank might want to use," the company noted, and to extract user-defined control totals as various batches of encoded documents are entered. The mini utilizes MOS/LSI memory.

But there was more than hardware on exhibit at the ABA conference.

The bankers also had new software and services to consider. University Computing Co. used the conference to announce availability of a Micr Input Capture and Reporting software system that operates under either DOS or OS/360/370, handles multiple reader/sorters, and supports on-line reject reentry and entry analysis for management.

Florida Software Services, Inc. told the DP managers about an updated 360/370 payroll package that handles variable pay periods (as many as 15 deductions per employee) and tax routines for all 50 states.

At the same time, PHI Computer Services demonstrated its on-line payroll data entry system for those users who want to control this phase of the application from a terminal.

Software Design, Inc., on the other side of the exhibit hall, described the use of Grasp's spooling capabilities in connection with a card reader that, the company claimed, in effect, turns the unit into a remote batch terminal for an IBM 360/370, at much less cost than a device that had been built for the purpose.

It's everything you've ever wanted in a peripheral for your mini. With a price/performance ratio superior to every other electrostatic printer/plotter on the market.

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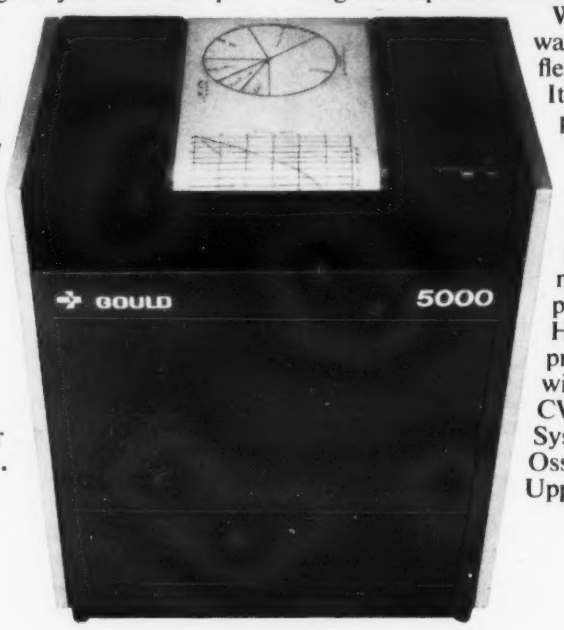

Optional features? The Gould 5000 is loaded. 96 ASCII character set, upper and lower case. 128 ASCII character set custom designed to your requirements. On-line mini-computer and off-line magnetic tape interfaces.

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DATA SYSTEMS DIVISION

GOULD

Do 'New' Products Reflect Period of Stabilization?

By Michael Weinstein
Of the CW Staff

NEW YORK – If end-user products released at the National Computer Conference are any indication of the mood and state of activity in the computer industry, it appears that the industry is in a period of stabilization.

In contrast with past shows, where new products promising new techniques dominated, the 1973 NCC end-user products were marked chiefly by peripherals for present equipment.

Many of the products unveiled are designed to attach to IBM central processors with the emphasis more on cost than on performance.

In terms of number, of the more than 200 exhibitors, only about 30 brought new end-user products. And a good proportion of these products included IBM 360-compatible units, supporting the feeling that the 360 is indeed not dead.

None of the major mainframes showed a new system. Even the mini manufacturers came up with nothing new, with the exception of Modcomp which entered a 32-bit mini.

A larger-than-expected number of products dealing with monitoring and maintenance were shown, suggesting that many manufacturers may feel the present equipment will be around for some time.

CW Photos by V.J. Farmer

CDC printer and controller is a plug-compatible replacement for IBM's 1403 N1 printer.

Attendees try out Potter's System 85 key-to-diskette unit.

Potter's System 85 Battles IBM 3740

The IBM 3740 key-to-diskette system at IBM's display ran into direct competition with the introduction of the System 85 by Potter Instrument Co.

The basic unit within the Potter offering, the DDS8505 Diskette Data Station, combines five data processing functions – keyboard entry, 4K bytes of read/write memory, a floppy disk drive, line printer and an optional communications unit – enabling it to be used either as a standard data entry device or as a remote batch system.

The S/85 incorporates a direct access capability, IBM 3740 format capability, 250 kbit/sec data transfer rate and a storage capacity up to 1,898 records (242,944 characters)/floppy disk. As an option, users can obtain a second diskette drive that doubles the storage to about 3,700 words.

The Potter system can use IBM-supplied floppy disks which means users can mix Potter S/85s and IBM 3740s. In addition, 3740 users can move to the S/85 with no software or hardware changes required, Potter said.

Hardware Wrapup

The diskette is loaded into the S/85 through a loading slot at the top of the drive. Closing the cover automatically positions the disk.

The solid-state keyboard is built around 64 alphanumeric keys. Additional function keys include record, field, character and advances.

Data being entered or edited is displayed on a 32-character display directly above the keyboard.

Mounted above the keyboard and display is a modified LP6150 printer – 132 column, 150 line/min. This unit can print the entire contents of a floppy disk in about 5 minutes, Potter said.

For transferring data to or from the diskette, a built-in controller acts as a buffer. For transfer away from a single station – to another station or to a remote central processor – the communications feature allows data transmission across dial-up lines.

In the remote batch application, a user would fill a diskette with data and when the central processor polls the station, data would automatically be transmitted or received.

Cost of the S/85 is $8,550. Adding the bisynchronous communications facility brings the cost up to $9,950. An equivalent IBM 3740 with communications capability and printer would cost around $14,000, a Potter spokesman said. The second diskette drive option costs about $1,000, including controller.

First deliveries are set for the beginning of 1974 from 532 Broad Hollow Road, Melville, N.Y. 11746.

CDC Shows Printer, Tape Units, 'Speed-Up' for 155

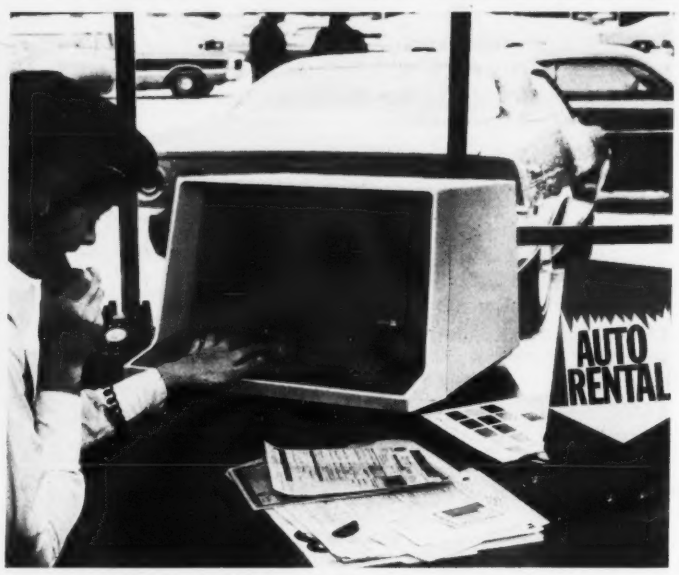
Control Data introduced IBM plug-compatible tape and printer systems for end users. The firm also announced a processor speed-up program for 155 users to "achieve the same performance advantages as IBM's 370/158," the firm said.

The 155 "development program" will include a processor speed-up using Control Data's monolithic memory for the 155. This will be coupled with a later dynamic address translator to give 155 users a virtual capability.

Both the memory and the DAT capability will be supplied to CDC by Advanced Memory Systems. The DAT box is

(Continued on Page 15)

For a national department store chain, with heavy mail-order business, Sanders display terminals produce swift, accurate confirmation of customer credit and expedite all kinds of order entry, retrieval and process-control operations. Sanders system components are widely known for their reliability and cost-effectiveness.



For two major car rental firms, Sanders data terminals link hundreds of reservation counters with central processing points regarding rentals, car control, check-outs, check-ins and other operations activities. Sanders systems are highly flexible . . . can expand easily as more sophisticated requirements develop.

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Corporate Headquarters

'New' Products May Reflect Period of Stabilization

(Continued from Page 14)

under contract but has not yet been completed, a CDC spokesman said.

The CDC monolithic memory has a higher performance at lower cost than IBM's, according to the spokesman. It will be compatible with the DAT box, which is expected to be priced about 25% below the IBM equivalent, he added.

The 3420-type tape subsystem is available in five speeds compared with three from IBM. The additional CDC speeds are 100- and 200 in./sec.

For a typical 125 in./sec 1,600 bit/in., 9-track system including 3803-type controller and 3420-5-type drives, CDC will charge $545/mo for the controller and $385/mo for the drive. IBM monthly rental is $625 for the 3803 and $440/mo for the drive, according to CDC.

The 1403 N1-compatible system with one 2821 controller and two printers costs $2,512/mo from CDC compared with $2,840/mo from IBM. The comparison is based on a two-year CDC lease and the IBM extended term plan for the same period.

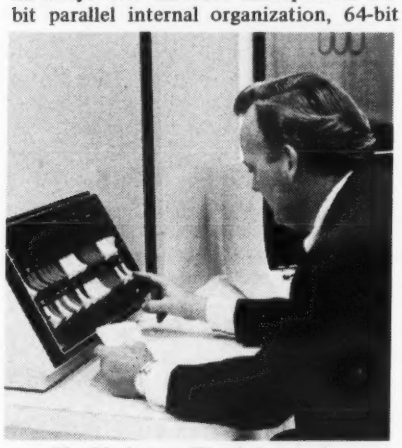
The CDC prices include 24-hour maintenance and additional savings are possible for users who sign up for longer than two years, the firm said.

Modcomp IV Handles 16-, 32-Bit Words

Modular Computer Systems (Modcomp) announced the Modcomp IV, a 32-bit minicomputer and the largest of its family of general-purpose computers.

Two models of the Modcomp IV are available, both with what the firm calls "dual word" processing capabilities. Dual word means the processor can handle either 16- or 32-bit words at the discretion of the user.

Both models – the Modcomp IV/10 and IV/25 – come with 32K bytes of core memory. The machine incorporates 32-bit parallel internal organization, 64-bit



The Modcomp IV minicomputer

floating point hardware, 240 general-purpose registers and memory expansion to 512K bytes.

The 32-bit capability directs the system primarily to users with large data base management applications, Modcomp said. The new processor is program compatible with existing Modcomp computers. However, the Modcomp III is to be discontinued and present users will be urged to upgrade to the newer processor.

Effective memory cycle time is 640 nsec, based on use in the 16-bit mode. When used as a 32-bit machine the cycle-time is nearly doubled as the machine draws 16 bits at a time and thus requires nearly two cycles to fill the 32-bit registers, the firm explained.

Price of the IV/10 is $18,500. Price of the IV/25 is $23,500. Both prices include the processor with 32K bytes of core memory.

Peripherals available include all existing lower model-compatible units. Additionally, all existing communications multiplexers, analog-to-digital converters and digital interfaces are available from 1650 W. McNab Road, Fort Lauderdale, Fla. 33309.

Ampex Add-On Replaces 360/65, 67 Main Memory

IBM 360/65 and 67 users can obtain 4M bytes of main memory with Ampex's ARM-2365 plug-interchangeable mainframe memory – the IBM limit is 1M bytes.

The IBM 2365 and the Ampex 2365 appear identical to the 360 central processor. Both units operate at speeds of 750 nsec.

Each Ampex cabinet holds up to 1,024K bytes in four 256K-byte increments. With the four increment approach, if one 256K-byte section goes down it is switched under operator control to the highest order so the entire system will continue to run under OS, a spokesman said.

Lease price on 1M bytes of Ampex add-on is $7,500/mo on a two-year lease. A maximum of 4M bytes rents for $30,000/mo on the same lease arrangement. Purchase price of 4M bytes of memory is about $800,000 from 13031

CW Photos by V.J. Farmer

Teda Corp.'s XRL/100 printer ribbon re-inker.

W. Jefferson Blvd., Marina del Rey, Calif. 90291.

XRL/100 Re-Inker Gives Printer Ribbons New Life

Teda Corp. hopes to dissuade users from throwing away their old computer printer ribbons after the ink has faded, with the XRL/100 that re-inks ribbons at the user's installation.

To control the re-inking operation the operator has two buttons: Power and Process.

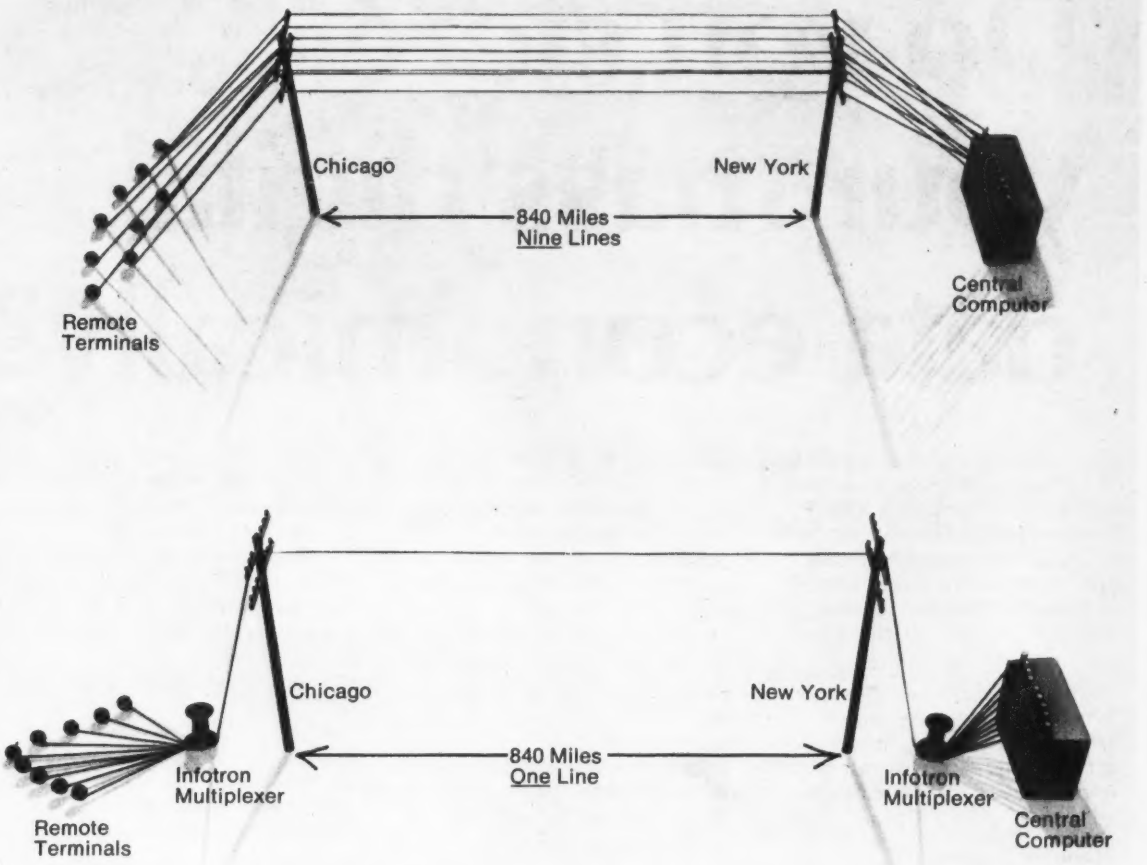
The portable unit can handle ribbons of high-speed line printers used in most mainframe and peripheral systems, according to the firm's spokesman.

Monthly rental on a three-year lease is $160/mo, $175/mo and $190/mo for units to handle IBM printer models 1403, 3211 and 1403/3211 respectively. Prices for other printer models are available on request. A purchase option is also available from 16641 Roscoe Place, Sepulveda, Calif. 91343.

Off-Line Printer Accepts IBM DOS, OS Tape Input

The newest member of Data 100 Corp.'s Seventy Series family of programmed terminal equipment, the Model 75 off-line print station, was announced at the NCC.

(Continued on Page 16)



We'll give you 30 days to find out which data communications system costs less.

On the face of it, that may not seem like much of a challenge.

Just count the leased long lines and you're done: nine leased lines will always cost more than one.

In the actual example that we based our illustration on, they cost exactly $5,410.06 a month more—even allowing for the lease costs of our equipment.

Time Division multiplexers: the efficient, least expensive way to fill a leased line with more data than Alexander Graham What's His Name ever dreamed of.

Which brings us back to our challenge: it's not a challenge. It's an offer.

A very straightforward offer: we'll come in, review your requirements, design a system and propose the system to you.

If our proposal makes sense to you—order the system. *But*, make your order subject to cancellation during the first 30 days after we install.

Sound fair? Or better than fair? Drop us a line and we'll call to set up an appointment.

Infotron Systems

Infotron Systems Corporation / 7300 N. Crescent Boulevard, Pennsauken, N.J. 08110 / (609) 665-3864

New Techniques Absent From 'New' User Products

(Continued from Page 15)

Components of the Model 75 include controller, card reader, line printer, video display console and magnetic tape drive.

Magnetic tape input data can be standard IBM DOS- or OS-generated tapes. A job control language (JCL) component of the print station software enables the user to select various fields from the input record and selectively format report lines on the high-speed line printer.

The controller is a programmed device which executes the print station software and links the various peripheral devices connected to the station. It contains 12K characters of solid-state memory; dual 1,330-character I/O buffers with 4K memory expansions available for larger I/O buffering; and an optional synchronous communications controller and appropriate emulator software, which turns the Model 75 into a Model 78 programmed terminal.

The optional 300-, 450- or 600 card/min card readers hold 1,000 cards.

The line printer component is either a 600-, 1000- or 1,250 line/min drum printer with Ebcdic, SBT or Ansi character set. The standard 64-char. set and an optional 96-char. (upper and lower case) set is available with either the 1,000 or 1,250 line/min printers.

A 132-char. print line, selectable 6- or 8 line/in. and multichannel verticle format control are also available.

The video display console displays 24 lines of 80 char./line.

Users have a choice of magnetic tape drives: IBM compatible 7- or 9-track, 556/800 bit/in.; and 9-track 1,600 bit/in.

Lease price of a typical system with a 1,000 line/min printer is $1,900/mo on a one-year lease from 7725 Washington Ave. S., Minneapolis, Minn. 55435.

Call Unit Enhanced

A new approach to automatic call distribution was unveiled by Collins Radio Co.

The Collins ACD System takes local calls to remote stations and automatically routes them to a central receiving station. This would be useful in such applications as airline reservations, Collins Said.

A video display at the central site tells the operator where the call is coming from and nature of the inquiry. Once voice contact is made, the same video display screen can be used by the clerk to obtain the data requested from the computer. This information is then transmitted by voice back to the original caller.

All switching, control and data collection operations are executed in digital form so the system is compatible with other digital data processing and transmission systems, Collins said.

System size depends on the total number of voice channels with a maximum of 600 channels.

Presently, the telephone company offers systems with a maximum capacity of 200 trunks and even at this level the Bell system does not allow the receiving operator to interact with the computer to determine answers to remote inquiries, according to a Collins spokesman.

Maximum number of receiving operators on the Collins system is 512.

A typical system handling up to 300 incoming calls to be directed to 225 clerks would cost $704,350 plus installation from 245 Park Ave., New York, N.Y. 10017.

Centronics Printer Leases For $200/Mo on 1-Year Plan

The Centronics Model 308, demonstrated at the NCC, is a 120 line/min, 80 char./line matrix printer that leases for about $200/mo on a one-year lease.

It is an incremental impact printer with a standard 64-char. Ascii set. Users can also specify elongated boldface characters on command as an option. Foreign and other character sets are also available as options.

The parallel transmission rate is up to 75 kchar./sec, and a serial rate from 100 to 9,600 bit/sec is available as an option.

Spacing is 6 line/in. with special features including backspace, horizontal tab and optional selectable column counter.

Purchase price is $2,690 from One Wall St., Hudson, N.H. 03051.

Documation Beefs Up Card Family for Mini Users

Documation added to its family of card equipment for minicomputers with the RP100 reader/punch and the D400 card reader.

The RP100 is an 80-column Ansi standard reader/punch with a hopper/stacker capacity of 1,000 cards.

Punch operating speed is from 100- to 285 card/min with the read-only speed rated at 400 card/min.

Electronics are TTL integrated circuit logic. Error detection is automatic verification utilizing echo check.

The D400 card reader accepts standard 80-column or optical mark cards. Hopper capacity is 800 cards with stack capacity set at 1,000 cards.

Reading rate is 400 card/min.

Cost of the RP100 is $11,700. Cost of the D400 is $1,650. The firm is at P.O. Box 1240, Melbourne, Fla. 32901.

Odec Hammers Away

A medium-speed printer introduced by Odec Computer Systems Inc. has print speeds up to 250 line/min in a quiet cabinet designed for office use.

The Odec 1423 printer uses a technique whereby all 66 hammers impact directly on their center faces. Each of these hammers fires twice during a print cycle to print the 132 characters in a full line.

The advantage of impacting extra wide hammers on their center faces is that it provides a larger margin in the timing of hammer firings and thus eliminates the need for later readjustment, a spokesman said.

Cost of the 1423 is about $7,300 and $7,900 for the quiet version from 25 Greystone St., Warwick, R.I. 02886.

DP May Go to Aussie Races

Special to Computerworld

MELBOURNE, Australia – Racing administration here may soon be computerized.

The Victoria Racing Club is currently conducting a study to determine whether racing should be automated.

The principal racing clubs in Sydney commissioned the V.R.C. to organize the study and the P-E Consulting Group is examining all facets of administration at the racing center.

Particular areas where automation could be used include racing performances, registrations and breeding.

"If approved, computerization could also be used in handicapping, compiling of racing calendars, form guides and turf registers," said Kevin Ryan, project leader and racing secretary-handicapper of the V.R.C.

Do you store your mass digital data economically?

Want massive archival recording at a practical cost? Need secure, non-volatile backup storage? Looking for on-line data storage to 2.2 billion bytes? Or what about document image storage with fast access and remote display?

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The amount of information that can be recorded in one year by a System 190, in its minimum configuration, is equivalent to nearly 200,000 reels of 1600 bpi magnetic tape. Media storage space is less than one-tenth that of tape.

Secure storage.
Data is permanently recorded. Magnetic fields or computer failure cannot erase data. No degradation. No wear. No dropout. No print-through.

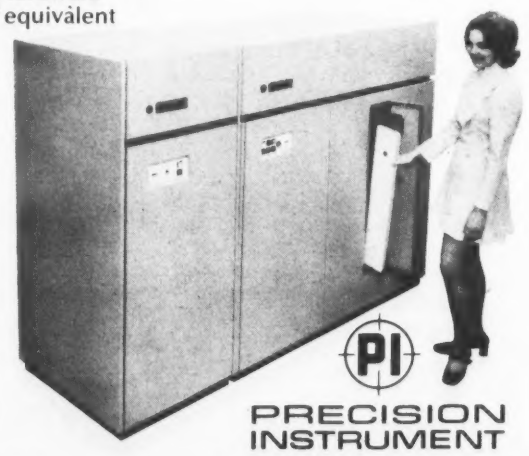
Computer-compatible storage.
Control unit interfacing allows use of existing computer tape programs. When used as a stand-alone system, data are transferred directly to peripherals —document scanner, plotter, printer, or CRT terminals.

Using tape emulator methods, System 190 follows standard 1/0 tape commands. Or use direct access method with simple keying from host computer. Or use the automatic spooling method that allows the 190 to feed data to other storage devices.

On-line storage.
In on-line data libraries, System 190 delivers these advantages *plus* high speed direct access to 275 million data bytes, expandable up to 2.2 billion bytes. With audit trail. And without clobbering old data. Hardware costs are half those of equivalent disc systems.

Document image storage.
In document image storage applications, System 190 supplies an automated document image handling system that is more efficient and less expensive than other automated systems. It provides rapid direct access to thousands of on-line images in less than 1 second per image and to millions more stored off-line in less than a minute. System 190 automatically distributes the retrieved images, either locally or remotely, for viewing or as hard copy.

Get the facts on the most significant advance in storage since magnetic recording. Write for "System 190" brochure.



PRECISION INSTRUMENT

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Enhanced Versions of Terminals Dominate Communications Area

By Ronald A. Frank
Of the CW Staff

NEW YORK – Enhanced versions of existing terminal technology predominated the data communications products at the National Computer Conference and Exposition.

Texas Instruments (TI) drew on its earlier display units to introduce the 912 CRT while Tektronix added new versions to its line of graphic displays and video hard-copy devices. Other devices which were outgrowths of earlier products included the Pertec remote batch terminal, a dial-up model of AT&T's 208 data set and an I/O printer from Centronics.

The TI CRT is designed for use with financial services supplied by Canter Fitzgerald Securities Corp. for the government money market, but the unit is available separately, a spokesman said.

The 912 operates with dual 960A or 980A minicomputers and can be configured to include a built-in modem and/or polling unit. The CRT will cost about $2,500, or about $3,000 with modem and other options.

The Tektronix 4014/4015 display terminals can address more than one million graphic points on a 19-inch storage tube. In addition, the 4015 has an APL character keyboard. The terminals cost about $8,450.

Pertec, Los Angeles, modified its OEM terminal to introduce a remote batch terminal system for end users. The DT1300 includes a send/receive terminal with key-to-tape entry and a 300 line/min impact printer. Paper tape and card units are also available with the DT1300. The terminal is compatible with Hasp software used with 360/370 systems. A typical terminal system costs $24,500 or $450/mo.

AT&T showed a dial-up version of its 208 data set, designated the 208B.

Christopher Allen of General Services Corp. looks on as Valerie Shepherd demonstrates the Pertec DT1300 system.

Communications Roundup

A five-button test panel on the data set provides loop-back capabilities, a remote test feature for operation with a "telephone company data test center."

The data set is expected to be ready for first deliveries in the third quarter of 1973 and will cost about $150/mo.

Centronics, Hudson, N.H., added a keyboard to one of its printers to provide users with an "I/O writer." The 120 char./sec unit also can operate at incremental speeds when data is being entered from the keyboard.

The Model 308 printer can operate at speeds up to 9,600 bit/sec with a separate modem. The base price of the 308 is $1,995 with an additional $695 for the keyboard and incremental print feature.

Omron Systems, Inc., Sunnyvale, Calif., introduced its 8025 CRT which is controlled by a microprocessor which can directly address up to 16K of RAM or ROM-type memories. The basic model including a 1,920-character display can transmit in either half- or full-duplex modes at data speeds up to 9,600 bit/sec. The terminal is priced at $2,350 and first deliveries are scheduled for November.

CW Photos by Ronald A. Frank

Don Roposo of Texas Instruments and Jack Flynn of Centronics consider the Centronics Model 308 I/O Printer.

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Editorial

An Auspicious Beginning

The first National Computer Conference is now history – a success from almost every vantage point.

The wide diversity of the technical sessions contained offerings to please the palates of almost every user, and the number and quality of the people at the exhibits pleased the marketing representatives.

The new technology buffs were probably the only segment of the computer community unhappy with the show, since most of the firms participating chose to add new products to existing product lines rather than introduce new technological advances.

Both the products on display and the technical sessions emphasized the increasing user interest in price/performance over technology. "More bang for the buck" was the watchword being hawked on the floor. The other message was that users are becoming increasingly interested in special products for specific jobs and that they're buying them when they find them.

The old arguments came up once again about the sessions, however, with criticism centering on the emphasis of prepared papers that rehashed old developments rather than the latest techniques, but this criticism was more muted than in recent shows.

Overall, the people at Afips –and the technical program chairmen – should be congratulated for putting on a show that can be truly meaningful to the computer community once again. The new five-day, once-a-year format seemingly pleased almost everyone.

Afips apparently has met its goal of offering a national convention for all segments of the computer community. We only hope next year's convention in Chicago can carry on this tradition and the promise that was evidenced in the first National Computer Conference.

Understand Oneself—Manage Oneself

Management

By Frank Greenwood, PhD

You cannot manage others until you manage yourself; and you cannot manage yourself until you can understand yourself.

The approaches to understanding yourself are many. A natural format for data processing professionals is that your mind consists of two historical files and a master control program.

The two files – both created before you entered first grade – are named "Parent" and "child." Input to your Parent file was the attitudes and behavior of your parents and similar people.

The permanently recorded data includes rules, procedures, prejudices and all external events which you were not free to question. Much of the data is inconsistent and it came from emotionally significant authorities.

Input to your Child file was your internal reactions to your early experiences. Since you had few words at that age, what is recorded is mostly your feelings about your world. Your Child file is the basic data for your current self-concept.

The attitudes in your Child file largely shaped your view of yourself and hence heavily influenced your success. Your master control program, named "Adult," processes the historical data from your Parent and Child files as well as current data, computing probabilities and outputing decision. (See *Born to Win* by James and Jongeward, Addison-Wesley, Reading, Mass., 1971, 297 pages.)

That is, your Adult program receives input from your Parent file (getting data on early attitudes or beliefs taught to you about life) and from your Child file (getting data about life as you experienced it in childhood) as well as from current transactions, then organizing and processing this input to produce decisions as its output.

Let's assume you feel hostile toward your boss because he rejected your plan for redesigning the inventory system and that your boss resents your hostility. This combination of rejection, hostility and resentment won't help you – unless you enjoy suffering – so you want to analyze it and eliminate it.

Your Child file may contain feelings of inadequacy. You were about two feet tall when it was created and maybe your perception of your world was that six-foot monsters told you: "don't do this" and "don't do that."

It may be that feelings of inferiority in your Child file were triggered when your boss rejected your plan, leading to your hostility. Therefore, maybe you are now in a mess because of belittling attitudes exhibited by your parents years earlier. Your Child file has thus made you the innocent victim of attitudes of others many years ago.

If this analysis is correct, you can help dissolve your hostility by sympathetic understanding of how your Child file got that way and then reprocessing your boss's rejection with your Adult program, deciding why your plan was rejected and how to modify it so he can "buy" it. Note that your hostility may have triggered feelings of inadequacy in your boss's Child file, leading to his resentment of you, illustrating how hostility can breed hostility, leading to who-knows-what.

If you found it impossible to gain parental approval as child, no matter how you tried, you may have a much tougher problem. Your Child file has valid transactions for the data that those in authority are uncaring and unreasonable. The permanent records from your Child file then support your feeling that your boss is cold and demanding.

Your Adult program processes this and may decide that you dislike your boss, so you become hostile. Lack of parental approval may thus force you into hostility toward every boss, which won't endear you to the brass. Again, you should sympathetically recognize the validity of the hostile feelings permanently recorded in your Child file. Your Adult master control program has to be patched so that this valid, but much earlier decision about people in authority is not part of the data processed in appraising your current boss.

There will be considerable debugging needed, but you can correct your Adult program. (These examples are but two from an infinite number of illustrations.)

(Frank Greenwood is computer center director at the University of Montana.)

Professional Groups Need Reordering

By Joseph T. Rigo
Special to Computerworld

It seems reasonable that any professional organization claiming to represent the computer community would have more than casual interest in computers.

In fact, as much as 30% of its activities – but no more – would probably revolve around hardware topics. These would cover mainframes and peripherals – past, present and future – and micros, minis and maxis, regardless of manufacturer or user.

At present in this field, only the IEEE Computer Society and the various user groups demonstrate any real interest in hardware.

Another 30% of an association's work would probably focus on systems software.

Most of our current professional societies dip into these areas to some extent, but very selectively. Only the IBM user groups, Guide and Share, have anything resembling strong programs, and they are restricted to matters of concern to IBM.

The remaining 40% of our association's work might be spread around various topics of current or continuing interest. These would include systems analysis, management, documentation, applications programming, education and training, public relations and all those other things that attract our attention.

Again, each of our existing associations is involved in one or more of these areas. But their efforts are scattered, and their involvement varies according to the needs of their unique slice of the computer community.

Finally, a real professional association for the computer field would carry on a full range of programs to reach those who cannot participate regularly in its national-level working sessions. That is, it would organize chapters, publish magazines, hold seminars and sponsor regional and local activities.

Most of our professional associations do indeed provide these services. Guide, Share and the other user groups do not.

Therein lies our problem.

Limited Involvement

Guide, Share and the other user groups have the activities that are of general interest, but they lack the administrative apparatus. Nor do they fully participate in the industry conferences organized by the professional associations.

The benefits of membership accrue mainly to IBM and to the relative handful of people whose companies send them to meetings regularly over a long period.

The professional associations have the publications and the chapters, but their activities are narrow in focus.

ACM's niche, for example, is academia, and the main thrust of its work is in that direction, no matter how much it seeks nonacademic members. Consider its special interest group in programming languages, Sigplan, one of its best and healthiest enterprises.

When I was last in touch with Sigplan, about two years ago, it was one of the world's leading sources of information about Algol. Algol seems to be big in academic circles. So is APL, and in this area, Sigplan's work actually appeared competitive with the Guide and Share APL programs.

On the other hand, Sigplan's Fortran and PL/I activities were anemic at best, and it was refusing to even recognize the existence of Cobol. For an academic trade group, this approach is fine. For an organization claiming to represent the entire computer community, it is intolerable.

This fragmentation of professional activities has been with us for sometime now, and I don't think we are well served by it. It should not be necessary for one person to belong to a dozen different organizations to keep up with all the technical factors affecting his daily work. We are not helped when some of the best talent gravitates toward groups that acknowledge no obligation to the entire community.

There was one attempt to establish some order a few years ago. This was when Afips was created as an umbrella society. But now Afips is just one more group, specializing in arranging conferences.

Hopefully there will be another attempt. Hopefully it will recognize that the user groups like Guide and Share must be included in any workable solution. Hopefully it will be led by people who aren't afraid to see a few bureaucratic empires shattered.

In the meantime, it would help if Guide and Share would at least put out a magazine.

Public Reacts to Equity Funding

Must In-House DP Be Banned as Too Open to Fraud?

"The truth, all the truth, and nothing but the truth," is apparently what the public-at-large expects from computerized systems, just as it expects truth from a witness in a criminal trial. The basic objection to the operation of the computers in the Equity Funding case is that the output included incorrect data. The fact that the input also included incorrect data does not, in the public eye, exculpate the computer system. The Gigo alibi has not been accepted, it seems.

The Taylor Report
By
Alan Taylor, CDP

The rationale appears to be that computer people have the basic capability to confirm the data, and, in failing to do so, lost the right to claim they had processed it properly.

How such failures to provide full and accurate processing could become dangerous was related by columnist Jack Anderson in an article entitled "How to Bribe a Congressman." In this article the columnist pointed out that the Avis credit card billing system provided facilities which could avoid billing the person who incurred the expense. Instead, in some cases, it was apparently paid for by ITT (which owns Avis).

There is, of course, nothing unusual in a computer, or non-computerized billing program, receiving charges from one person and charging a different one, or simply not charging at all. But Anderson's point was that this could lead to systematic bribery, with the computer producing acceptable reports which lacked the detail necessary for anyone to see what was happening. After all, from a technical point of view, nothing could be simpler. But when it happens that the recipient is a Democratic congressman from California, and the firm that eventually ends up with the bill is a very large and potentially political corporation, there are many bad implications.

Control Method

One way in which a situation like this could be controlled (although not entirely avoided) would be to place the use of computers under independent professional computer control. This is like, for instance, forbidding drug firms to themselves administer drugs they develop directly, and insisting upon a responsible intervening person to do the testing, check the plans, monitor the results, etc.

Unfortunately, the computer area has not so far developed a group of responsible professionals who owe their loyalty to their profession, and who could take the responsibility of ensuring that the billing programs were not being used to bribe congressmen or for other unprofessional practices. There are such people, of course, but they are simply not recognized by the public, or honored by the practitioners. In fact no professional employment structure currently exists which can make such responsible operations economically viable!

In short, it simply does not pay to take data processing responsibility. At least not when it is most needed!

Yet now more than ever it is necessary for someone to take such responsibiltiy. Until recently the situation has been that only the data processors themselves realized how easy it would be to at least start a fraud. (The outside world still thinks it is also easy to complete one. But one of the real lessons of the Equity Funding case is that the inclusion of a computer system, approximately last December, was what actually put an end to the fraud.)

Criminals Looking for Computers?

Now, however, the situation has changed. Now the commercial community has been warned that crime and computers are good partners. Anyone in the commercial community now knows where to look if he wants to commit a crime and needs an accomplice. They have been told to go and look for a nice programmer or operator who they can, in one way or another, control and who perhaps is not too bright, or perhaps has too high an idea of corporate loyalty, and not high enough an idea of public or professional responsibility.

With that situation it will now be easy to set up a fraud which involves the corporate officers and some frightened computer people.

This possibility of corporate executive-initiated crime must be taken very seriously from now on. And the only way to prevent this is to prevent loyalty to the firm affecting the way data processing is handled.

Removing the Temptation

This means all genuine data processing work (as opposed to simulations, management studies, etc.) would have to be handled by a computer outside the control of the corporate president. Probably the computers and the programming would be handled by service bureaus or by large time-sharing systems.

I would be sorry to see this. The in-house computer has many advantages for firms. Even more, in-house programming has advantages. But it seems clear that if the cost of these advantages is making computers vulnerable to use by corporate criminals, then in-house systems will have to go. Unless, of course, we develop a group of professionals.

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U.S. Steel Not Codasyl's Problem

Readers Respond

A correspondent has sent me a persuasive defense of U.S. Steel, which, in my March 28 column I suggested was the key to Codasyl's problems. To some extent the defense was off base. I did not rely upon Warren Simmons for too much of my information, relying instead on the lack of availability of minutes, interviews with Jack Jones, chairman of the executive committee, and other executive committee members, discussions with Ronald Ham, chairman of PLC, and other PLC members.

Outside this minor point, however, the statements in the letter, although only given anonymously, appear to be verifiable. Certainly the current method of election provides no protection within Codasyl from people who stay on after their days of great contribution are over.

The question is, however, and my correspondent does not take this into account, whether such kindness, while pleasant to the particular person, is injurious to the general data processing user. Although my correspondent might think the Codasyl Planning Commitee is a low-risk position, this is simply not true.

The Codasyl Planning Committee is there both to evaluate the performance of the other committees, and also to provide for feed-back information to the other committeee. Far from being a low-risk position, it is the most important – from the public point of view – of all the committees.

In past years, however, it has not been doing its work, and Jack Jones tells me he will not permit it, or any committee or person, to get in the way of the Programming Languages Committee. How then can it do its work?

Here is the letter, which, from its phraseology, appears to be from a member or an ex-member of Codasyl:

Dear Mr. Taylor,

I think you have really stuck your foot in your mouth this time. You need to verify your information before you make strong accusations. I refer to your column of March 28 suggesting that U.S. Steel was the key to Codasyl's problem. In fact, the perceptions of Gerard McBride (Warren Simmons, not U.S. Steel, is the villain) in the April 25 issue are correct. It seems evident that you relied chiefly on Warren Simmons for the information on which you based your March 28 column. The fact is that Warren Simmons is probably the biggest problem Codasyl has.

In 1968 (July) Codasyl was reorganized. One of the reasons was to get Simmons out of any position of influence so that his actions would do minimum damage to Codasyl. A new committee called the Planning Committee was formed for Simmons.

It was a low-risk position. If something good came of it – great (that is, if Simmons did something in that position), but if nothing happened, the rest of the Codasyl committee could get along without it.

The purpose of the Planning Committee was to serve as a liason between Codasyl and the users and implementors in the computer industry. In previous reports you have properly identified the major weakness of Codasyl being the lack of an effective relationship with the community outside of Codasyl. I trust that now you understand one of the key reasons for the problem.

Simmons is the first to volunteer for a job when the need arises. Unfortunately, he seldom earns the position, nor carries out the responsibility satisfactorily.

Simmons is seldom representative of Codasyl. Ostensibly the newsletter was a good idea in concept, but it was poorly executed. It is often inaccurate with respect to Codasyl.

Talk to any enlightened member of Codasyl and this information will generally be confirmed. If you succeed in having U.S. Steel withdraw its support of Simmons entirely, you may have unwittingly helped to solve one of Codasyl's problems.

Name Withheld

Letters to the Editor

Consumer Does Have Right To Accurate Credit Record

Re "No Credit Here," R.L. Vennell's letter [CW, May 23]:

He said, "credit is not yet a right guaranteed by the Constitution." I'll buy that. But the consumer has every right to complete, accurate and timely reporting of the facts, public record or otherwise, which become a basis for the "privilege" of credit.

Are the credit bureaus as concerned with timely correction of erroneous data as they are with the original reporting of that data? The consumer should make his credit record, but all too often it is vendor errors and incomplete credit bureau data that make the record.

The consumer has rights that must be protected where that record is involved.

T.J. Dowd

San Jose, Calif.

D'Unger Not the Only One With Spelling Headaches

I have been enjoying the continuing saga of Robert M. D'Unger and his frustrations in trying to have his name spelled correctly by the "wonderful world of data processing."

Allow me to enter a similar complaint, but one that must be even more common than D'Unger's.

The name of our firm is U.S. Datacorp, spelled and punctuated exactly that way. Would you care to hazard a guess as to the infinite number of possibilities this opens up to key-entry operators, if in fact they are the ones to blame?

Who decreed that punctuation is "verboten" in our industry? What gives most everyone (including *Computerworld*) the vision and insight to decide that we don't know how to spell our own name?

I made a survey of computer-printed labels on publications and advertising pieces around our offices and came up with these statistics: labels checked: 21, correct spelling: one.

Most common misspelling: US Datacorp. Somehow our initials have become a word.

Other misspellings were US Data Corp, US Data Corp., US Data Corporation, US Data CP, U S Datacorp, U S Data Corp, United States Datacorp, U.S. Data Corp. and U.S. Data Corporation.

Surely recognition is due the one publication that cares enough to spend those fractions of a cent it might take to do things the right way, and actually insists that their key-entry operators "punch 'em as they see 'em."

Let's hear three big ones for *The Journal of Micrographics*, a bimonthly publication of the National Microfilm Association.

Norman H. Friedman
Vice-President

U.S. Datacorp.
Portland, Ore.

RPG-Cobol Debaters Seem a Bit Prejudiced

Programmer types who have written letters to *Computerworld* about the pros and cons of RPG, RPG II and Cobol seem rather prejudiced.

Cobol programmers who have never written RPG or RPG II naturally feel Cobol is superior. RPG is markedly inferior to Cobol; however, RPG II has many Cobol features incorporated into it; features Cobol programmers can't picture in ("yeech!") RPG.

The RPG or RPG II programmer has taken affront to attempts to "put him down" by demeaning his language and has reacted by launching his own campaign against Cobol.

In effect this debate has become rather emotional.

My own experience covers RPG, ANS Cobol and RPG II, in that order. I found RPG II to be virtually free of the old RPG limitations. I am back to using Cobol at this time and miss many of the coding features of RPG II. I can write an RPG II program and get it debugged in half the time it takes for Cobol.

Shops that value efficiency far above programming time should be ALC and not Cobol users. Cobol is not *that* much faster running than RPG II. RPG is obsolete since the release of RPG II.

Roland A. Radinski

Trenton, Mich.

Computerworld welcomes comments from its readers. Letters should be addressed to: Editor, Computerworld, 797 Washington St., Newton, Mass. 02160.

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Dennis G. Sisco—Marketing Manager

Coding Techniques For POS Systems— Pick Your Favorite

By Toni Wiseman
Of the CW Staff

NEW YORK – Topics ranging from electronic cash register input units to automatic ticket printing were the focus of an NCC session on electronic point-of-sale (POS) systems in the retail industry.

E. Thomas Doddridge, NCR retail accounts manager, cited improved customer service and unit control information input as the justification, and chief objectives, of automatic ticket reading.

The coding technique, according to Doddridge, should provide high density (a large number of characters per inch), the potential for source marking directly on packages, built-in error checks and security controls to guard against price tag alterations.

The pros and cons of coding techniques were also scrutinized at the session.

Magnetic coding has the advantage of high density, but on the minus side it provides a limited depth of field, little potential for source marking, is expensive and the shelf life of magnetic tapes is still in question, according to Doddridge.

Optical bar coding affords a lower density, he said, but it lends itself readily to source marking, uses conventional stock and requires no particular orientation. Color bar coding requires more complicated printing, but is highly reliable, has a high density and precision printing is unnecessary.

OCR coding is still a thought for the future, according to Doddridge, due to the fragility of the reader. "Quite frankly," he said, "OCR technology for POS looks promising for 1980, but not for the present."

Two other panelists discussed the technology of POS, and its applications in the grocery store industry.

John M. Hunt, vice-president and chief technical officer for Singer Business Machines, described several POS systems, ranging from a large-scale operation with 50 or more terminals to a small store installation in which each terminal has its own tape storage unit but several terminals tie into the same modem.

A third system converts cassette information to one-half inch magnetic tape, taking advantage of intelligent terminals.

W. Rilley Daniels, director of food distribution systems for Sweda International, covered "POS in the Grocery Store Field."

Order size, daily volume changes and environmental factors, such as customer service concepts and the utilization of baggers, are only a few of the variables affecting POS operation, according to Daniels. POS is also affected by the input unit chosen, he stated.

Daniels outlined the merits and drawbacks of conventional cash registers, stand-alone electronic cash registers (ECR), dedicated ECRs and scanning devices. "The key issue in selection," said Daniels, "is the upward compatibility of the unit, its potential for development."

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Random Notes

MIS for Large Projects Installed on Al/COM Net

JENKINTOWN, Pa. – A management information system written in Fortran IV and intended primarily for financial control and accounting of project-oriented operations has been installed by the developer, Analytics Inc., on the Applied Logic Corp. (Al/COM) time-sharing network based in Princeton, N.J.

The system produces fiscal status reports covering labor, materials, overhead, "G&A" items, profit and other elements for both projects and subprojects. The system prompts the non-DP operator through the entry of all relevant data, and provides both logical and arithmetic error checking to make sure input is "clean."

Analytics, Inc. is in the Fox Pavilion, Foxcroft Square, 19046.

Avco Adds Amplex Core, Disks To Expand 360/75 for RJE Work

WILMINGTON, Mass. – Avco Computer Services, which provides remote job entry service based on an OS/Hasp-oriented 360/75, has recently installed the Mark IV File Management System as part of its software library.

The company has also doubled the main storage capacity of its CPU with the addition of 1M byte of Ampex add-on core, and has increased its on-line storage capacity to 728M bytes with the acquisition of nine new Ampex disk drives.

Avco is at 201 Lowell Ave., 01887.

Auto, Truck Fleets Monitored

MINNEAPOLIS – Truck and automobile fleet managers can have greater control over operational costs with the Automated Vehicle Analysis System (Avas) recently installed by Control Data on its Cybernet remote-computing network, with consulting support supplied by CDC's staff.

Developed by Oklahoma-based Innovative Computing Corp., Avas accepts data on fuel consumption, miles and hours of vehicle operation, revenue produced and equipment failure.

From this information, the system generates a set of performance reports by vehicle, groups or classes of vehicles, or the user's entire fleet, including average performance of a vehicle or the fleet.

NCR Expands in Atlanta Area

ATLANTA – NCR will have an immediate 70% jump in the processing capacity of its regional data center when the center is moved, this fall, to a new facility now under construction in Technology Park, a company spokesman claimed recently. The center, handling both on-line savings bank work and batch processing for other users, will share the new two-story building with the company's regional marketing office.

RPG? Cobol? No

Clothier Says Adpac Suits Its Needs

By Don Leavitt
Of the CW Staff

CHICAGO – A currently available and growing language system, Adpac overcomes disadvantages of both RPG and Cobol, while retaining the flexibility of Assembler, according to Hart Schaffner & Marx Clothes' programming manager Thomas T. Osberg, who added that his shop has been using Adpac heavily since the spring of 1969.

Developed and distributed by Adpac Corp., San Francisco, Adpac is a high-level language which, like RPG, relieves the programmer of many routine chores. Although the Adpac specification sheets "take some getting-used-to," Osberg said, the system generates a logic shell that can be as simple or as complex as the user wants.

Many Possibilities

"I can't think of anything you can do in Cobol that you can't do in Adpac," he added, " and there is a lot more you can do in Adpac that you can't do in Cobol. Bit manipulation and character string manipulation are two major facilities that come to mind.

"There are some fairly basic system interfaces that Cobol just doesn't support but Adpac does," he noted, "like device-independent processing and off-line print files."

Osberg characterized Adpac as "fairly flexible" in linking to external routines. It has a "special hook," he said, for I/O routines that have to pass file definition information at execution time. And Adpac also can Link in and Load external modules from the user's Core Image Library "which you just can't do under Cobol."

Hart Schaffner & Marx Clothes has a 360/40 in-house, a 370/135 on order and a dozen programmer analysts under Osberg, in addition to a team of five working on fabric cut planning operations, and two more in the retail sales division.

There is a heavy workload of 1400-series programs still running in emulation mode, but these are being rewritten in Adpac, Osberg explained, so that they will be ready for the 370, due in December.

Only two of his staff work regularly in Assembler. All the rest work in Adpac, the manager said, adding that of the production programs written for the 360, about 50% are Adpac, 30% BAL and only 20% Cobol.

Osberg then admitted there are "obviously some things you can do in Assembler that you can't do in any high-level language," but said he couldn't think of a single major problem for an application program written in Adpac compared with one written in Assembler.

The company behind Adpac is generally very responsive to user needs, he said, but the lack of an active distributorship in Chicago over the couple of years has caused problems. These have been primarily in the area of finding experienced Adpac programmers or of gaining support for training new staff members in the language.

Competition Pushes Improvement In Data Dictionaries; Users Win

BURLINGTON, Mass. – The move to more effective data directory/data dictionary support goes on and the users – particularly those not yet ready to go into a complete data base management system – are the potential winners as the vendors improve their offerings.

Data directory/dictionary software typically provides a system of creating, maintaining and retrieving information from a file which, in effect, inventories the data used throughout a DP installation.

Careful use of this file, which may show both responsibility for and ultimate use of each data element, can reduce duplication and the potential for using improperly maintained data.

Now Synergetics Corp. has added several new features to version II of its Data Catalogue package [CW, Dec. 20], to make it more responsive to user desires. Source code from users' Cobol Data Division file descriptions (FD) can, for example, be used as input to create at least a skeleton of a Data Catalogue listing for each element.

Another new feature reverses that pattern and supports the creation of File Section Data Division entries for files, records or programs from the Data Catalogue.

Synergetics has also added two new reports to give users a better perspective on how they are using their data – the Security Level Report and the Frequency of Access Report.

The basic Data Catalogue system, supporting both narrative and technical descriptions of the data elements being posted, costs $6,500 and operates in an OS/360-370 environment. The feature allowing conversion of FDs to Catalogue entries costs an additional $1,500, while the FD generation feature sells for $1,000.

The Security Level and Frequency of Access reports are available for $250 each, a spokesman noted from One Garfield Circle, 01803.

'Dinos' Aids OEM or DP Manager

OAKLAND, Calif. – Data General Nova users can get as much or as little of a real-time operating system as they need with the introduction of the Dinos family of systems from Decision, Inc. The Dinos packages are geared to both the OEM and the end user of Decision's disk units and controllers, the company said.

Dinos-I and Dinos-II are said to provide the OEM shop or the sophisticated systems programmer with an extremely efficient base for building end-user systems. Dinos-III, on the other hand, provides the end user with all the generality of a full-scale, real-time, multiprocessing system.

I/O Multiprocessing

Dinos-I is the most compact and fastest of the three systems. It offers the power and capabilities of Decision's DOS, but also I/O multiprocessing and buffered I/O support. Round-robin or request stacking program-controlled scheduling and task interrupt linkage are also provided.

Programming in the Dinos family is done in assembly language and interrupt response time is less than 25 μsec on all versions, a spokesman noted.

Dinos-II, scheduled for release this month, has broader capabilities than Dinos-I, but by storing seldom-used I/O driver routines on disk, it has a lower core residency requirement. This level of Dinos provides automatic program segmentation, dynamic core allocation and support of both multiprogrammed non-resident tasks and bulk-resident programs.

Dinos-III, planned for the fourth quarter of this year, adds more features the end user might need for his general-purpose operations. These include full-scale multiprocessing, and foreground/background support complete with on-line task control, Decision said.

Roughly comparable to Data General's Real-Time Disk Operating System (RDOS), Dinos-III has multiprocessing Fortran, Assembler, Editor and Basic processors, as well as a standard executive system and background checkpoint facility.

Said to be efficient by current end-user industry standards, Dinos-III consumes more core and has "significantly less" processing throughput than either of its companion OEM versions. The system will be free to end users who have acquired Decision's disk units and controllers.

Dinos-I and -II are currently priced at $2,000 and $2,500, respectively, for the OEMers, Decision noted from 5601 College Ave., 94618.

For MMS General Ledger Users 1973 Will Be A Happy Year.

Since January, 20 companies have ordered the MMS General Ledger System. Each one of these corporations is worth more than $20 million (one is in the $800 million class). They all have the programming staffs and resources necessary to develop their own corporate financial systems. But even the big companies don't have unlimited EDP budgets.

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Graphics Made Easy

NEWTON, Mass. – A software package that can be used by non-programmers to generate line, bar and pie charts on various graphic output devices has been developed by Gould Data Systems for either business or engineering applications. With the Display package the actual plotting can be done either on- or off-line, a spokesman noted.

The language available to the Display user is composed of English-like commands and key-word constructs that can be written in a free-form style, and keyed directly into the user's CPU. Input can also be obtained from user files or drawn from any 360/370 compatible data source.

The software is forgiving, Gould noted, since it tolerates input coding errors and still produces a chart. If an unreasonable command is entered or a graph specification omitted, the Display program will produce a "best effort" graph accompanied by a description of the input error.

Output from the system can range from simple charts to sophisticated graphics. Post-processors are included to make the output acceptable to Gerber, United Drafting Machine, Calcomp or Gould plotting devices.

The system is designed to run on any IBM 360/370 under either OS or DOS, and including systems with Hasp, Power, Grasp or any of IBM's VS operating systems. Display requires a minimum of 44K bytes of internal storage.

It is available for a one-time charge of $2,500 which includes the post-processor.

Gould Data Systems is at 20 Ossipee Road, 02164.

New York Times Opens Information Bank For On-Line Scan of Published Stories

NEW YORK – *The New York Times* has begun full commercial operation of its Information Bank service, providing on-line accessibility to abstracts of articles that have appeared in the *Times* or in any of 65 other publications. Full microfilm or microfiche text of the *Times* articles is also available as an extra-cost option, a spokesman added.

Although on-line searching of abstracts is not in itself an innovation, the *Times* operation is perhaps unique, an industry observer noted, in that it is not focused on a limited range of references, such as chemical abstracts, Instead, the *Times* has attempted to abstract everything it has published.

Searches are conducted in the classic manner, by matching users' key-word entries to stored indices, and the entries can be refined through the use of Boolean connectors (AND/OR/NOT). The system notifies the user of how many abstracts match the search key before it sends any to his terminal, the *Times* said.

Searches Narrowed

But the system does have a mind of its own, according to Dr. John Rothman, director of information services. It will not display any abstracts if it has more than 1,000 matches for the user's search key. Instead it will instruct him to narrow his search, through rewording or through Boolean logic.

In a similar vein, though the system can sort abstracts chronologically before passing them to the user, it will not do this if more than 112 abstracts have been identified as appropriate for the search key as given. Other sort keys allow display of abstracts in accordance with the position the original stories had in the paper, with page one first.

In addition to a comprehensive abstract of the cited articles, the *Times* service shows for each abstract the publication in which the article appeared; the date, page and column of the issue; the source, especially if one of the wire services; an indication of whether illustrations accompanied the text; and – for *Times* stories – a reference to the appropriate microfiche frame for the full text.

The service can probably be accessed by any terminal, but Rothman recommends use of a programmable Incoterm unit with a built-in CRT screen and an attached Centronics printer, linked into the service on a leased telephone line. The CRT allows quick scanning of many abstracts, he explained, while the printer capability allows the hard-copy capture of selected items.

'Practical Limit'

There is no technical limitation on the geographic area the service can reach, Rothman added, but he warned that users have to pay their own line costs "and that certainly imposes a practical limit on what firms or research institutions can use it."

The *Times* also recognizes that not all users need the service full time, so it offers two pricing schemes. Unlimited access is available beginning at $1,350/mo, not counting the cost of the terminal or the communications line. The user with limited needs can access the system anytime from 8 a.m. to 1 p.m. daily, or for up to 25 hours of connect time per month regardless of the time of day, for $675/mo.

Cost/Analysis Service Aids Steel Buyers

PITTSBURGH, Pa. – Manufacturers with substantial requirements for steel may be able to save money as well as storage space in their own factories with the Cost Item Analysis (CIA) service now available without cost from U.S. Steel's Supply Division.

CIA is designed to help the user find out for himself the tradeoffs to be considered between buying large quantities of an item direct from a steel mill or getting somewhat smaller quantities from the steel company's more local "retail" warehouse. Mill prices may be somewhat less, the company noted, but to get them, the user may have to commit himself to providing storage space that is worth more than the steel itself.

Optimum Pattern

Under CIA, the user is lent a portable terminal – an Execuport – and the use of a series of programs stored on a mainframe at U.S. Steel's computer center here. Working with a series of input sheets, the user puts his own production and cost figures into the system and reworks them until he finds what he deems the optimum purchase pattern between mill and warehouse.

There is nothing in CIA that limits the user to studying just U.S. Steel as a supplier, a spokesman noted.

The system is keyed to individual items within a user's steel needs, since turnover time in inventory is one of the critical factors in determining how to buy stock, and that varies widely by item.

The CIA input sheets take into account data from the user's purchasing agent, accounting department and production.

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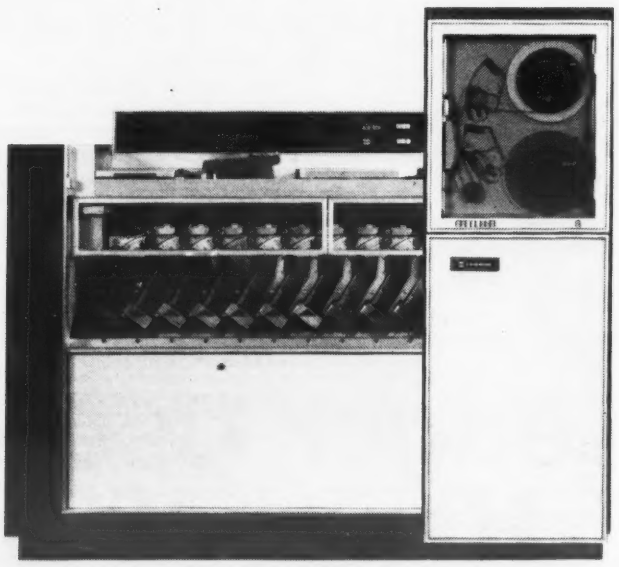

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Data Briefs

Omnus Controller Enhances Terminals on Univac 1100

SANTA ANA, Calif. – Omnus Computer Corp. has introduced an enhanced Communication Terminal Module Controller (CTMC) for the Univac 1100 Series mainframe.

The CTMC is compatible with Exec 8 software and can change the type of terminal operating on-line either automatically or on command. It also is said to extend the 1100 to terminals not usually supported by Univac such as the IBM 2780.

A minimum configuration of the CTMC includes eight synchronous lines up to 9,600 bit/sec and 16 asynchronous lines up to 1,800 bit/sec and a backup controller for $65,000. A comparable capability from Univac would cost about $80,000, according to an Omnus spokesman. The firm is at 1538 E. Chestnut St., 92701.

CRT Terminal Shows 132 Char.

HACKENSACK, N.J. – SYS Computer Corp. has announced a CRT display terminal whose screen offers 132 char./line in a 5 x 7 matrix.

The terminals come with both parallel TTL and standard RS-232-C interfaces operating at up to 9,600 bit/sec.

The terminals are available as stand-alone units or in cluster configurations, with a tentative stand-alone price of $7,200.

Delivery is five months from 17-25 Di Carolis Court, 07601.

Wiltek Terminal IBM-Compatible

NORWALK, Conn. – Wiltek, Inc. has combined a punched card reader with a standard Wiltek base to produce a send/receive terminal.

The Model 820 terminal is compatible with IBM hardware and software.

The base houses all the electronics for the terminal.

The 820 reads 200 card/min, automatically crunching the 12-bit Hollerith code to an 8-bit code for synchronous transmission.

Each of the buffers has a 50K-character storage capacity.

The modem, equivalent to a Bell 202C, operates in a half-duplex mode at 1,200 bit/sec or at an optional 2,400 bit/sec.

The Model 820 costs about $12,000 from Glover Ave., 06852.

San Francisco Seminar Set

LOS ANGELES – The American Institute of Industrial Engineers (AIIE) will sponsor a seminar on data communications systems in San Francisco, June 37-29.

The seminar will survey communications system design and optimization.

Registration information is available from AIIE, Box 25116, Los Angeles, 90025.

Replaces IBM 7770

Independent Audio Response Has Bonus

By Ronald A. Frank
Of the CW Staff

PORTLAND, Maine – When an independent audio-response system replaces an IBM system at lower cost and also provides increased communications capabilities, the user probably has a good deal.

That is the case at Maine National Bank here where a Wavetek ADC 1000 system has replaced an IBM 7770 system, thus saving the bank about "one third" on its equipment costs, according to Dave Withee, assistant vice-president for data processing.

But that is only part of the story. The ADC 1000 will allow the bank to incorporate innovations which were not possible with the 7770. Among these are the possibility of moving the Btam access method out of the 370/145 mainframe and having it reside in the ADC 1000 processor.

The processor is really a DEC PDP-11/05 with 16K of storage that performs the control functions for the audio-response system. Other future capabilities include the emulation of 270X line controllers and emulation of the IBM 2848 CRT controller.

The latter is important, Withee said, because of a planned switch from IBM 2260 CRTs to Hazeltine displays. By eliminating the cost of the IBM 2848 controller (about $600/mo) and switching to lower-cost CRTs, Withee believes the bank will get additional savings.

But meanwhile there are immediate benefits from the ADC 1000 with the bank's present application. The bank's 31 branches use a data base in the 145 to authorize check cashing, post interest on savings accounts and other daily transactions.

These inquiries are initiated by tellers at any of the branches using Touch-Tone phones. The audio-response system has a vocabulary of 64 words that can tell the inquiring teller the current balance of an account, authorize the cashing of a check or give any number of answers.

More than 200 telephones can access the Portland DP site from as far away as 100 miles. Each teller, or other bank official, who needs account information enters an identifying code on his telephone which then provides access to data base information. Control of the access codes rests with the bank's auditing department and in three years of operation the system has never been violated, Withee said.

With the 7770, the same application was operating with six Bell 403 modems which each cost about $50/mo. These have now been eliminated since the ADC 1000 has built-in modems. The only other addition has been the necessary CBS data access arrangements from the phone company.

The on-line system is handling about 1,200 call/day and a complete printout is provided daily of all inquiries by access code, the account number accessed and other pertinent audit data. The ADC 1000 was installed over a weekend with little effort. The interfacing was directly to the 145 multiplexer channel and the DOS software did not have to be modified.

The ADC 1000 system emulates a magnetic tape subsystem on the 145 channel, according to Withee. This will provide some in-house programming advantages not possible with the IBM 7770.

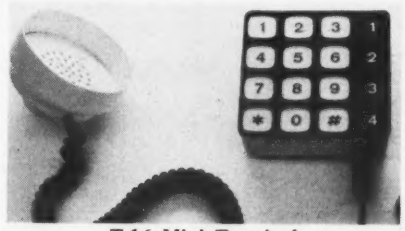
Pocket Terminal Generates Bell Touch-Tones

ANN ARBOR, Mich. – Interface Systems, Inc. has a "pocket-sized" terminal that can be acoustically coupled to any standard phone. By generating Bell-compatible two-out-of-eight frequency tones, the T-16 terminal can be used for remote data entry.

The terminal includes the usual 12-key Touch-Tone pad with an additional four control keys. When used in conjunction with an audio-response system, the user can receive answers to inquiries through the telephone handset.

Since the T-16 includes a built-in tone generation capability, it can be used with the dial telephones. It produces tones compatible with Bell 403 data sets or independent equivalents.

The terminal is acoustically coupled to a phone through a speaker which clips over the handset mouthpiece. The terminal including speaker and keyboard costs $140. Delivery is 30 days from 5 Research Drive, 48103.



T-16 Mini Terminal

Toronto-London Line Open

TORONTO – I.P. Sharp Associates has opened a transatlantic 2,400 bit/sec circuit from Toronto to London to give English customers access to its APL Plus service.

The 3kHz channel operates with Codex 810 multiplexers and is currently serving six users in London over private-line facilities provided by three common carriers.

From Toronto to Montreal the line is supplied by Bell Canada; from Montreal to "mid-Atlantic" the circuit is controlled by the Canadian Overseas Telecommunications Corp.; and from there to London, the line is supplied by the British Post Office, according to Keith Armstrong, communications specialist at Sharp.

Users in London use a variety of 134.5 bit/sec terminals including IBM 2741s, Novar units and some Datel terminals, all operating with correspondence code. The present users must access the APL Plus service from the London Sharp office. But the British Post Office has approved a dial-up tie-in using its Datel 200 service. This will allow expansion in early June to serve about 16 users who will use Datel 200 bit/sec terminals from their own offices.

The Codex multiplexers are interfaced with International Communications Corp. modems at the London end and in Canada the Tel-Tech 201B data set is used.

The APL Plus service data base resides in dual 370/145s at the Sharp offices in Toronto.

GTE Has IBM-Type Front End

WHITE PLAINS, N.Y. – GTE Information Systems has added the IS/1101 to the low end of its line of IBM-compatible communications controllers.

The IS/1101 terminal control system includes a communications processor, channel adapter and communications scanner which handles up to 40 lines. These can include 24 asynchronous and 16 synchronous in half-duplex mode.

The programmable processor employs 16-bit parallel data paths, 750-nsec memory, console and 32K bytes of memory. It is compatible with the earlier Tempo 270T front-end processors which now carry the IS/1100 series designations.

The front-end unit can directly replace IBM 270X line controllers. It supports data speeds up to 50 kbit/sec operating with Ascii, Ebcdic and other transmission codes. The 1101 is compatible with GTE and IBM hard copy and CRT terminals.

An 1101 front-end with a 360/370 interface, scanner and one asynchronous line set will cost about $820/mo with maintenance. Purchase price is $25,500 and deliveries are 60 days. GTE is at Four Corporate Park Drive, 10604.

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U.S. Users Eye Canada's Route

By Ronald A. Frank
Of the CW Staff

OTTAWA, Ontario – The digital data communications network recently introduced by Canada's Computer Communications Group [CW, March 14] can provide some important benefits for U.S. data users.

U.S. firms that regularly transmit data to points within Canada can enjoy significant savings with the digital Dataroute instead of using conventional analog facilities within Canada.

These users would get AT&T analog links to the nearest Dataroute Serving Area (DSA) across the border. At the DSA, the signals would be converted to the all-digital system.

Lower-Cost Alternative

Although the Canadian carriers have restrictions which include a flat prohibition against "two-border crossings" for the same transmission, some users see the Dataroute as a viable lower-cost alternative to coast-to-coast AT&T rates. These users would avoid the dual-border crossing prohibition by utilizing store-and-forward hardware.

For example, with a user transmitting from Los Angeles to New York, the data might be sent to a multiplexer or concentrator in Vancouver. The message would go through a store-and-forward procedure being sent from Vancouver to Montreal, and the same message-handling would take place in Montreal with the data being sent on to New York.

Although the Canadian rates on Dataroute would be well below the AT&T charges, some users are skeptical of the real advantages. They feel the cost of the store-and-forward hardware might well overshadow any line savings.

One U.S. user who has seriously considered using the Dataroute sees some significant savings at 2,400 and 9,600 bit/sec. For private-line analog facilities between Montreal and Vancouver, a 2,400 bit/sec link costs $3,770/mo compared with $1,826/mo on the Dataroute. A 9,600 bit/sec analog line costs $4,620/mo while the Dataroute rate would be $3,908, the user said.

Along the Dataroute

Despite some reports that Canadian carriers are favoring "new business" rather than converting existing users from analog to digital facilities, a Bell Canada spokesman said prospective users for the Dataroute are being handled on a first-come-first-served basis. At present there are four users on the digital service, none of which are U.S.-based, he said.

Some users see the Dataroute as best serving the smaller user who needs from one to five channels. Above this number the trade-off swings in favor of an in-house multiplexed system using analog facilities, these users say.

Communications Package Handles Distributed Net

PALO ALTO, Calif. – Hewlett-Packard has a hardware/software communications package that allows satellite minicomputers to interconnect with a central system.

The firm said its 91701 distributed systems package allows any number of satellite minicomputer systems to interconnect with a multiprogramming real-time executive (RTE) system, as though each satellite mini were the central system's only user.

An HP 2100S computer-based RTE system, the heart of the distributed system, contains one or more disk drives, distributed systems software and communications interface cards for the satellite computers.

The satellite systems are also 2100S-based. They have core-resident Basic Control System (BCS) operating systems, plus distributed systems software, communications interface cards and full I/O capabilities for instruments, data collection equipment and display terminals.

The satellite systems can simultaneously engage in a variety of tasks and can be connected into or disassociated from the distributed system at will.

Each satellite system user has access to the central disk through Fortran, Algol or Assembler programs.

The 91701 distributed systems communications package costs $6,000. It is immediately available from 1501 Page Mill Road, 94304.

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'No Universal Wrench' Available

User Favors Building His Own Over Turnkey System

WASHINGTON, D.C. – George Washington University Hospital has decided to develop its own small computer-based communications and information system rather than obtain a turnkey-type system.

"We've tried to home-grow a system to perform a variety of functions, according to our particular needs," stated Dr. William Yamamoto, head of the hospital's clinical engineering department.

No 'Universal Wrench'

"That's really the only way you can get a cost-effective apparatus," he commented. "I don't believe you can just go out and buy a 'general-purpose' system for something like this, any more than you can find a universal wrench."

The hospital system is described as a communications control system because it accepts, stores, retrieves and updates information entered from terminals at various points in the hospital.

Information entered covers management and accounting, patients' medical and demographic records, medical treatment data including a large volume of inputs from the hospital's intensive care unit and information for research files.

A major parameter in choosing equipment for the system was to combine large disk file capabilities with a relatively small central processor.

The Small Systems User

"The ability to handle big files is a requirement in most biomedical applications. Unfortunately, some of the minicomputers on the market can only handle minidisks," Yamamoto stated.

The system the hospital settled on is based on two Varian 620/f-100 machines – one acting as backup for the other.

Each computer has 24K words of core memory and each has access to both of the system's large storage disks – 29M byte/disk.

An input/output bus switch allows utility peripherals (card punch, card reader, line printer) to be switched to either central processor.

A data communications front end provides 16 telecommunications parts for each machine, for connection of telephone lines. The front end can be later expanded to carry 128 ports for each computer, Yamamoto noted.

Information can be retrieved as a video terminal display or in hard-copy form.

The system's software is built around Varian's Vortex software package which allocates resources so general-purpose background tasks can be run concurrently with real-time foreground operations.

Using the Vortex package, users do not have to get involved in such tasks as I/O handling, interrupt servicing and resource allocations. These operations are handled by the real-time executive (RTE) in the central processor's main memory.

With the foreground/background capability the system can assign priorities to real-time tasks (such as the retrieval and updating of medical information) which can then be run immediately or held for future processing.

Batch processing for applications such as general ledger and accounting operations can be run concurrently in the background mode, Yamamoto added.

Union Members Happy With New Worker

BOSTON – Before Local 22 of the Construction and General Laborers' Union purchased a small computer, the job of accepting dues, handling receipts and stamping union cards for 250 members took about five hours.

Now if 250 members want to pay their dues at the union hall, they can have their cards stamped and their receipts in hand in about one hour – or 15 seconds for each member.

While speed is the most obvious improvement in the dues collection procedure, the new computer provides other services such as the preparation of reports which are required as a byproduct of the dues collection procedure, according to

Once the magnetic ledger card has dropped into position, the operator enters the new information, the card is updated and the receipt is printed on the continuous form.

Michael Tarallo, secretary-treasurer for the local.

But the basis of the functions remains the collection procedure which consists of the following five functions:

- Preparation of the receipt, printed by the computer.
- Updating the day book, prepared automatically as the receipts are printed.
- Totaling the day's income.
- Updating a magnetic ledger card which contains the status of each member account.
- Verification of the day book.

The magnetic ledger cards are the key to the Nixdorf computer system. When a member pays his dues, his ledger card is pulled from a file, and new entries are made to update the information typed on the card and stored in the magnetic stripe.

During the procedure, the receipt is printed and the day book and verification record are printed.

This same magnetic ledger card is used to provide the data from which other reports are generated, including a monthly dues control report (showing daily dues income), income report (other than dues), expense journal and payroll control card.

Another function taken over by the system is membership mailings. In the past, the names and addresses had to be typed every time a new mailing was prepared.

Now the computer prints letters with the members' names so that windowed envelopes can be used.

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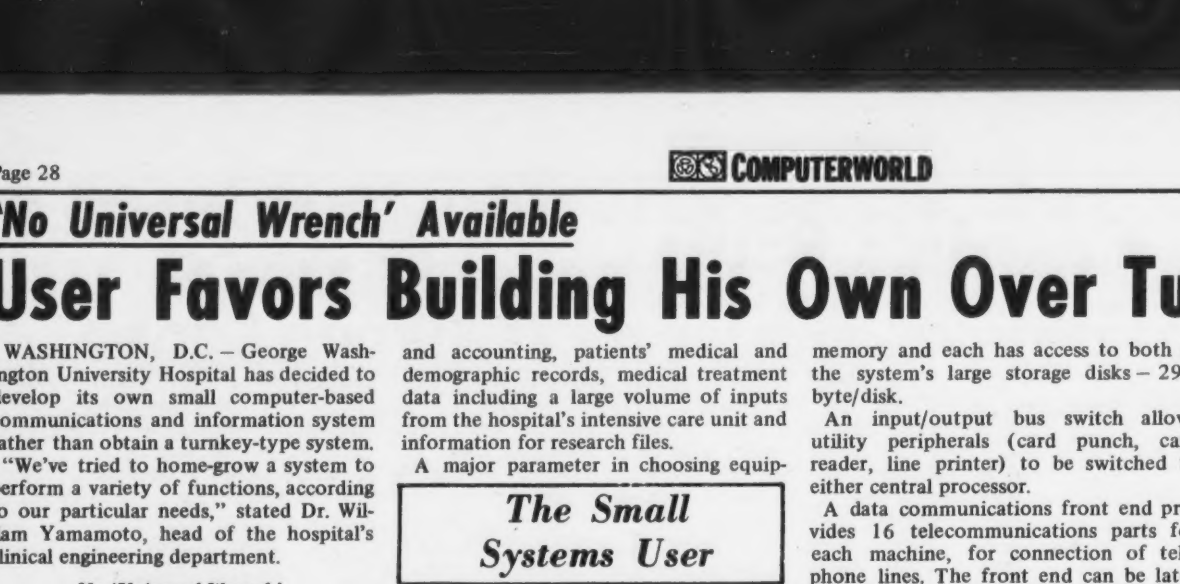

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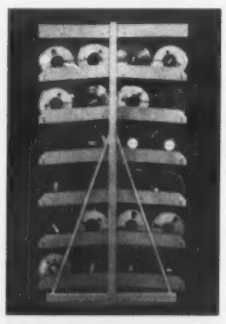

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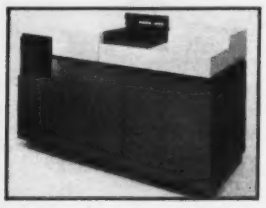

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Bits & Pieces

Hardware-Stack Interface Unveiled for PDP-8/e

NEEDHAM, Mass. – A hardware-stack interface that enables the use of reentrant code on the PDP-8/e minicomputer is available from Delta Control Systems, Inc.

Operationally, the HS-101 permits several shared programs to make subroutine jumps without the need for expanded memory or time-consuming reiterations, according to the firm's spokesman.

The unit operates as a temporary data register, controlling one or more stacks in memory. The status of an interrupted routine is entered into the stack with a single I/O operation.

As soon as the higher-priority routine is complete, the status data is dropped from the stack, and the original routine is resumed from the interrupt point.

The HS-101 is supplied in modular form and plugs into the processor's Omnibus.

Cost in single quantities is $3,600 from 14 Charles St., 02194.

Tape Evaluator Enhanced

BURLINGTON, Mass. – Computer-Link Corp. has announced two additional types of error detection for the firm's Series 1000 Magnetic Tape Evaluator/Cleaner.

The first addition is an independent error detector for both temporary and permanent error conditions.

The second error detection option is designed to find wrinkled or cinch areas on tapes formerly used with older, dual capstan-style tape drives. This option segregates these errors from normal temporary write error conditions, allowing users to remove bad tapes before they are scheduled for use, the firm said.

Computer-Link is at 14 Cambridge St., 01803.

Separator for Low-Volume Jobs

DAYTON, Ohio – A forms separator from Standard Register Co., the Model 800, is designed for low volume, short run operations.

The unit will process forms having two or more copies, removing and refolding one copy and rewinding the carbon, while refolding the remaining copies and carbons.

The Model 800 operates at variable speeds up to 400 linear feet/min. Delivery is three weeks beginning in July. Price is $550 from 626 Albany St., 45401.

Noise Less on Burroughs Encoder

CITY OF INDUSTRY, Calif. – Users of the Burroughs Series "S" Encoder can obtain a Soundoff Dampener (Model 8222) to reduce noise levels around the Burroughs unit.

Price of the acoustic covering is $129 from Van San Corp., 1180 Centre Drive, 91748.

Airline Reduces Staff

User Increases Data Throughput 20%

By Michael Weinstein
Of the CW Staff

MIAMI – With two years' experience on a key-to-disk system, Eastern Airlines has achieved a 20% increase in data throughput and decreased the data entry staff by nine operators, according to Mary Snyder, manager of data recording.

In addition, Eastern's data-handling requirements have increased by about 15% per year during this period and new industry conventions for data entry have led to massive reformatting of old information.

Currently, more than 50 different data entry jobs are keyed on the Inforex 1302 systems, including interline ticketing, passenger statistics and earned revenue calculations. These jobs represent more than 75% of all the airline's data entry requirements in the data recording center.

In addition to this bulk entry, a change in industry standards meant the ability of the shared processor to reformat data once it has been entered on the disk subsystem was a significant feature, Snyder added.

Eastern and other airlines with which it shares interline flight revenue have been in the process of changing ticket forms from a 12-digit identifying code to a 13-digit code.

At the present time, about half of all records employ the older 12 digits in the check digit field of the record.

In the past, this disparity caused problems in the use of the check digit, since check digit calculations can't be performed on a field that varies in length. Under the former system, checking could not take place until the data had been entered into the central computer file, at which time exception records were generated from the completed records, stated Francine Zmuda, senior control analyst.

Using the key-to-disk system, the problem is averted before it ever reaches the mainframe, she explained. The operator keys the full check digit code if the 13 digit format is used, and the check digit calculation is carried out by the shared processor.

When the 12-digit code is used, the operator keys a leading zero to allow calculation on the shortened field. Then, when the data is transferred from disk to tape, the key-to-disk system automatically inserts the correct digit in the high order position.

If the number is the 13-digit code, the high order digit is simply overlaid with itself, but if it is the 12-digit code, the significant digit is entered in place of the high order zero.

Expanded Tape Feature

In addition to cleaning up records before they leave the data entry section, the key-to-disk system provides Eastern with a number of additional capabilities including packing of records and an expanded tape processing feature, Zmuda said.

These features enable the system to condense the disk and tape space required for processing of records and increase the operator efficiency by reducing the frequency of disk-to-tape transfers, she added.

For example, by packing, she stated that Eastern operators are able to put four 29-character records into each 125-character record on the disk. When information is transferred to tape, the records are automatically expanded to the standard 80-character length.

The system at Eastern is composed of 12 keystations clustered on a shared central processor. Data entered into the system is displayed on a video display terminal at each station.

This allows the operator to read and verify records as they are entered and before they go to the disk.

Information can also be viewed after it has been entered onto the disk and corrected if necessary.

Honeywell Adds 12 Peripherals To 700 Minicomputer Series

WELLESLEY, Mass. – Honeywell has introduced 12 peripherals for the 700 series of minicomputers and reduced the price for some existing peripherals.

Included in the new offering are two magnetic tape subsystems, three card readers, five line printers and two removable disk subsystems.

The two magnetic tape subsystems incorporate redesigned controllers, adapted from the Series 16 minicomputer line. The 700 series subsystems have a 12% price reduction over the earlier tape units with no degradation in performance, according to the firm's spokesman.

Model	Three-Year Lease (cost/mo)	Purchase
Line Printers		
5515 (200 line/min)	$ 420	$14,400
5516 (200 line/min)	535	20,400
5526 (450 line/min)	675	31,300
5527 (650 line/min)	900	42,850
5524 (950 line/min	1,150	54,800
5529 (1,100 line/min)	1,130	60,700
Card Readers		
5100 (300 card/min)	160	7,150
5123 (600 card/min)	290	12,500
5122 (1,050 card/min)	380	16,700
Magnetic Tape		
4041 (7-track & control)	410	13,200
4051 (9-track & control)	410	13,200
Removable Disk		
4740 (1.1M word)	425	14,900
4743 (7.5M word)	990	34,525
Reduced Price – Existing Peripherals		
5121 (800 card/min reader)		$335/mo
5140 (card reader)		$600/mo
5520 (300 line/min printer)		$590/mo

Cost Figures for New Peripherals and Reduced Prices for Existing Peripherals

Both the 7- and 9-track drives provide transport speeds of 26 in./sec and rewind speeds of 78 in./sec. Recording densities of 200-, 556-, or 800 bit/in. are available on the 7-track drives, and 800 bit/in. on the 9-track units.

Up to three additional tape units can be added to a basic subsystem consisting of a single tape unit and controller. These tapes are stated to be compatible with all sytems that satisfy Ansi requirements for NRZI recording.

The three card readers expand the 700's card capability from 300- to 600 card/min at the low end to 1,050 card/min at the high end of the 700 series.

All readers, including the original 800 card/min unit, perform data sensing through a photoelectric system that reads alphanumeric or binary punched cards on a column-by-column basis. They have automatic hardware code conversion in alphanumeric mode, Hollerith to six-bit BCD code.

The five buffered line printers expand System 700 printing capability from 300 line/min to 200-, 450-, 650-, 950- and 1,100 line/min. Line widths of 96-, 120- and 132 characters are available. All printers are supported by OS/700 software and a test and maintenance program.

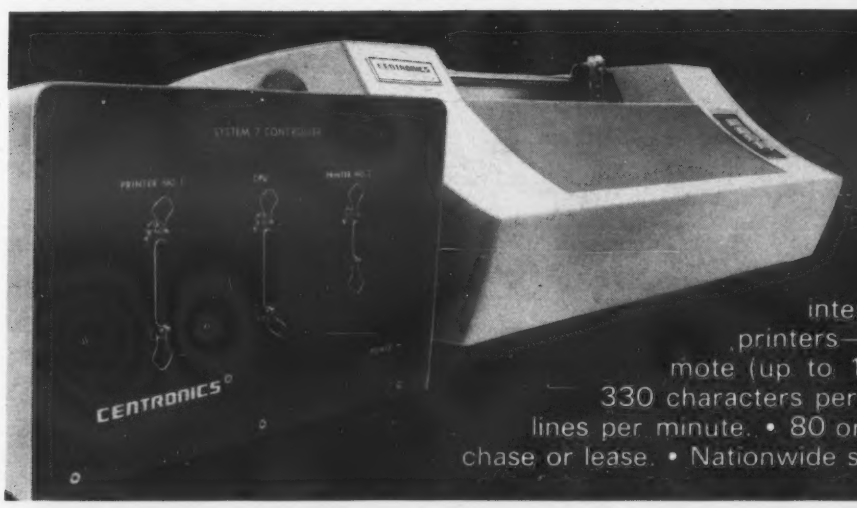
Removable disk packs containing six or 11 disks each provide 10 or 20 recording surfaces respectively. Each surface has 200 recording tracks that are formatted according to parameters established by the user, the spokesman added.

Semi Memories Get UPS

SANTA MONICA, Calif. – An uninterruptible power supply for volatile semiconductor memory systems is offered by Pioneer Magnetics, Inc.

The PM 2412 is a 140W convection-cooled converter designed to provide up to 32K x 18 or 65K x 9 MOS RAMs at worst case temperatures.

The firm is at 1745 Berkeley St., 90404.



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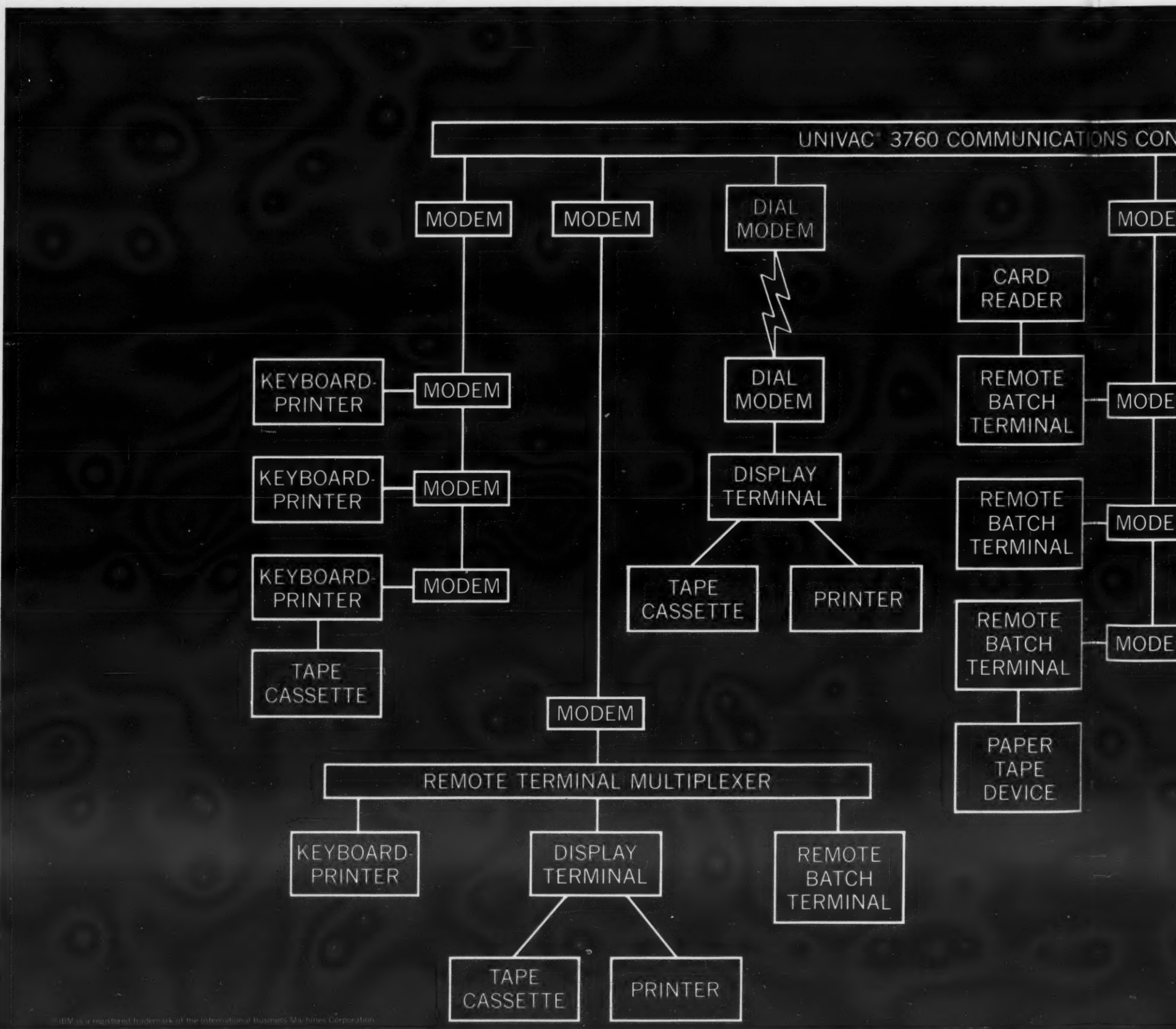

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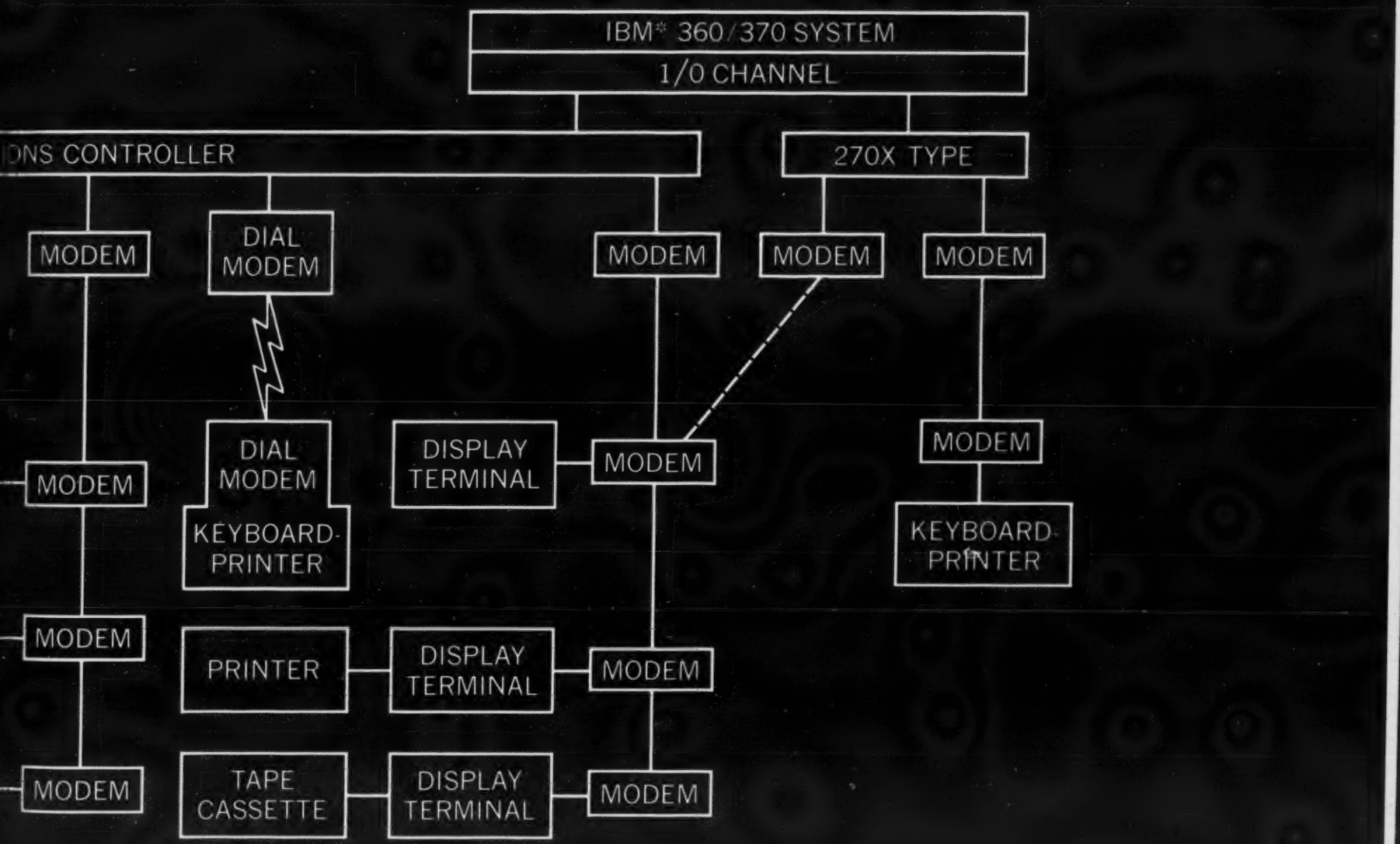

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Can Attach to 370

IBM Offers High-Speed Check Processor

WHITE PLAINS, N.Y. – IBM has announced a high-speed document processor designed to enable banks to process and distribute checks at twice the speed of the IBM 1419 magnetic ink character reader, previously IBM's fastest Micr reader.

The IBM 3890 can be operated on-line to a System 370 by storing its own sorting programs and by holding data in its buffer memory for periodic transmission to the computer.

The unit attaches to the 370/135 through the 370/168 running under IBM's OS/VS1 or OS/VS2.

The IBM 3890 can be linked directly to virtual storage models of the 370 or used off-line.

Self-Contained Logic

When used off-line, the 3890 has self-contained logic and a removable disk storage subsystem which allows the reader/sorter to perform "advanced fine sorting, reducing the number of times a check must be processed before sorting into its final sequence," according to the firm.

Available with up to 36 sorting pockets, the 3890 can read and sort a typical mixture of different-sized checks at a rated speed in excess of 125,000 document/hr, and can print a batch and identification number on each document to improve item control.

The new reader/sorter is designed to enable a single operator to maintain uninterrupted processing on a unit with 18 pockets. Features allowing this capability are:

- A large-capacity hopper that holds up to 4,800 checks.
- A built-in joggering mechanism that automatically aligns checks for processing.
- Pockets, with a capacity of 900 checks each, that can be unloaded without stopping the machine.
- A system of warning lights that identifies pockets needing to be emptied, and signals the operator when the hopper is low.

Under IBM's extended term plan – providing for a 24-month contract – rental for the 3890 with 18 pockets will be $7,600/mo. Under the IBM rental agreement the monthly charge is $8,931. Purchase price for the unit is $356,700.

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OEM Products

While equipment in this column is primarily for Original Equipment Manufacturers (OEMs), in most cases it is also available in single units to interested users. Further, while some of this equipment is not presently available to the end user, it does give some indication of techniques and products that may be incorporated into end-user equipment.

OCR System Reads Variety of Fonts

OAKLAND, Calif. – An optical character recognition (OCR) system that reads numeric or alphanumeric OCR, A and B fonts; data in a variety of other fonts – including IBM Courier, upper and lower cases – and data from typewriters, preprinted forms, computer printing and numeric handprint, is being offered to OEM builders at a cost of about $30,000 in quantity, from Decision, Inc.

The OCR 7600 reads at a rate of 600 char/sec. Pages and documents, from 3 in. by 5 in. to 9 in. by 14 in., are scanned before the paper is moved.

Additional fonts and system control are available through the use of IBM 3740-compatible floppy disks.

Data, once read, can be entered on-line to a central processor or off-line to magnetic tape, paper tape or communications lines.

The unit interfaces with all major systems in use today, according to a spokesman. It can be operated in a plug-to-plug compatible mode with the IBM 3886 Model 1, connected to a System 370 or off-line with 800 bit/in. NRZI or 1600 bit/in. phase encoded magnetic tape. The 7600 has a communications output capability of up to 9600 bit/sec in Ascii or Ebcdic.

More Facts to You

A floppy disk subsystem permits additional fonts and diagnostics to be added and is available for error information and data. It can also be used to program the unit to read data from existing forms, as opposed to having to redesign forms so that data is in a form suitable to the reader.

Editing of difficult-to-read data can be handled manually or with a keyboard/video terminal station.

Decision, Inc. is located at 5601 College Ave., 94618.

Floppy Disk Drive Can Read, Write on IBM Floppy Disks

SUNNYVALE, Calif. – An OEM floppy disk drive that can read and write on IBM 3740-compatible floppy disks is available from Shugart Associates.

A typical operation for the independent floppy disk drive would be to prepare data using the IBM 3740 system and use the Shugart drive to input this data to a minicomputer.

The firm states it has interfaces for most minicomputers and can design and build additional interfaces to meet demands.

The SA900 measures 9-1/2 in. by 4-5/8 in. by 14 in. and can be installed individually or stacked in a rack mount.

Access time for the independent drives is 10 msec with a 3M-bit storage capacity.

Unit prices start at $750 from 335 Soquel Way, 94086.

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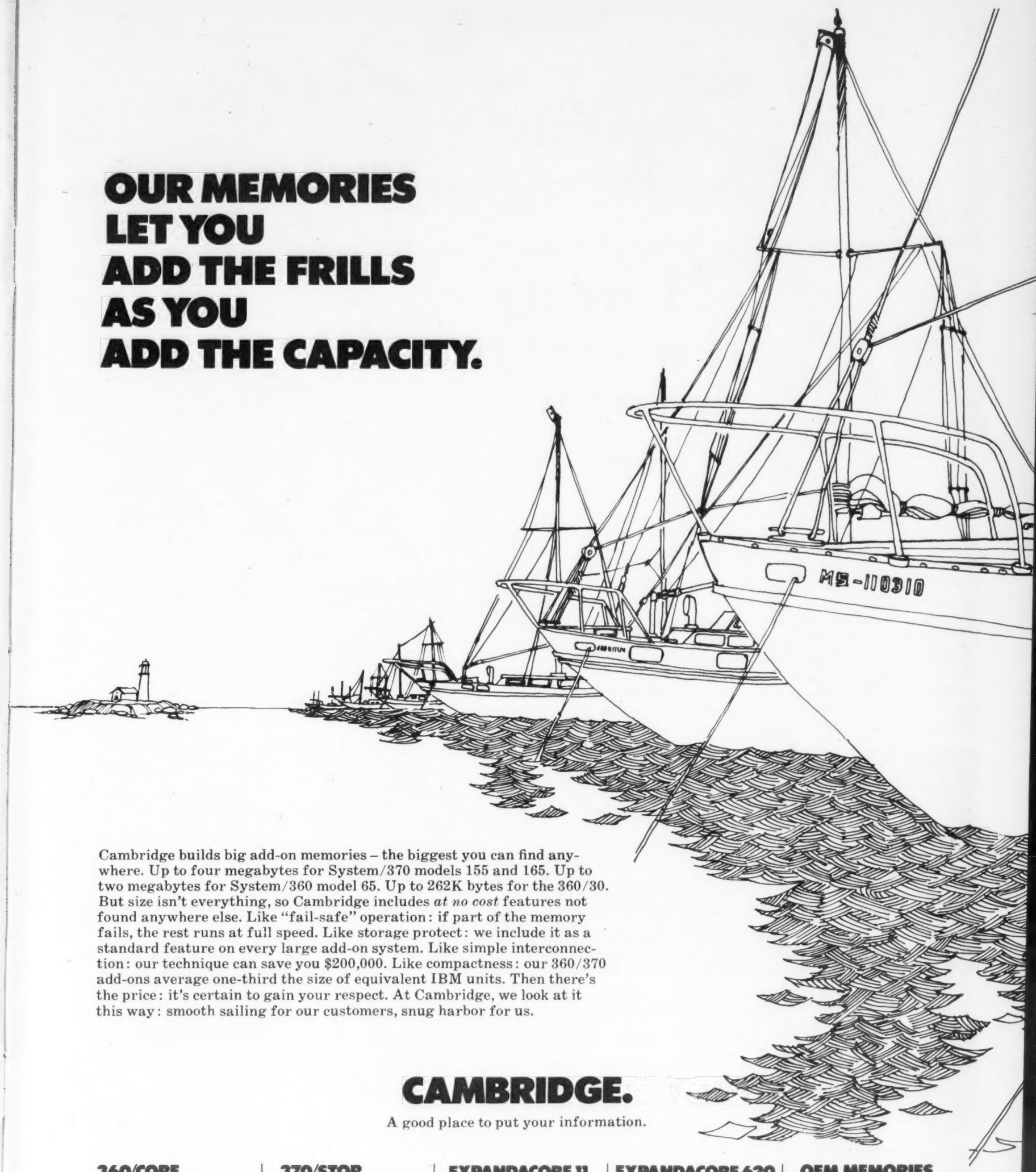

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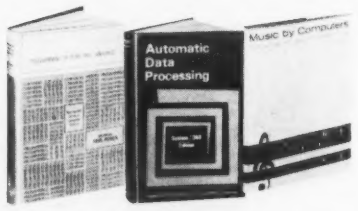

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New OEM Products

Intel Has Microcomputer Modules, PL/I Subset

SANTA CLARA – Intel Corp. has introduced two modular microcomputer development systems – Intellec 4 and Intellec 8 – designed as basic systems from which larger MCS-4 and MCS-8 OEM systems are constructed.

The firm also released a high-level language (PL/I-type) for the MCS-8 microcomputers.

The Intellec 8, 8-bit modular computer is designed around the MCS-8 microcomputer set, while the 4-bit Intellec 4 is designed around the MCS-4 microcomputer set. These microcomputer sets were introduced by Intel in November 1971.

Program Loading Eased

The newer models are designed to have all program storage accomplished using random access memories (RAMs) rather than read only memories (ROMs). The switch to RAMs is to provide easier program loading and modification.

Both systems have a front panel control and display console for system monitoring and debugging.

The Intellec 4 and Intellec 8 come complete with central processor, memory I/O, crystal clock, TTY interface and power supplies.

The modular form allows the OEM builder to buy as little or as much as needed for a specified application. These modules can be used for pre-production systems development and for expanding the memory and I/O capability of the Intellec systems.

Language Derivation

PL/M is a high-level language derived from IBM's PL/I with control structure and variable definition facilities of PL/M similar to PL/I. The data types and basic operations reflect the architecture of the Intellec 8 and Intel 8008.

The PL/M compiler is written in standard Ansi Fortran IV and thus will execute on most machines without alteration.

The Intellec 4 and Intellec 8 will be available for delivery in October 1973 at $2,195 and $2,395 respectively for single unit quantities. Micro-modules to expand basic systems are optional at extra cost.

PL/M will be available in July 1973 for $1,250 when purchased directly from Intel at 3065 Bowers Ave., 95051.

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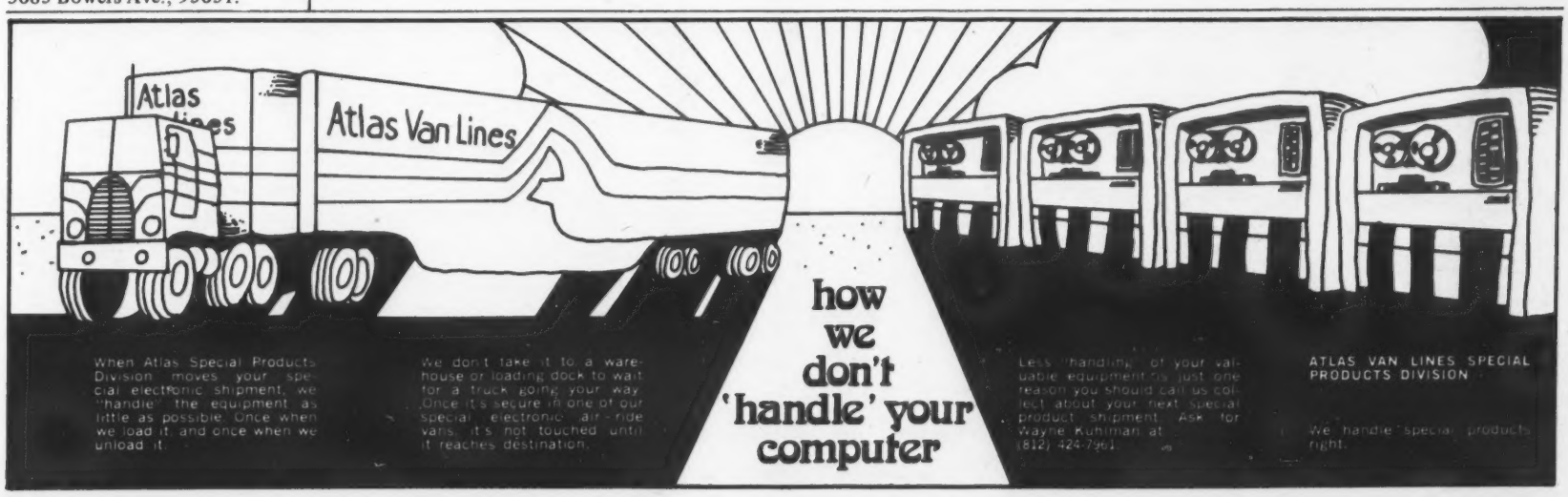
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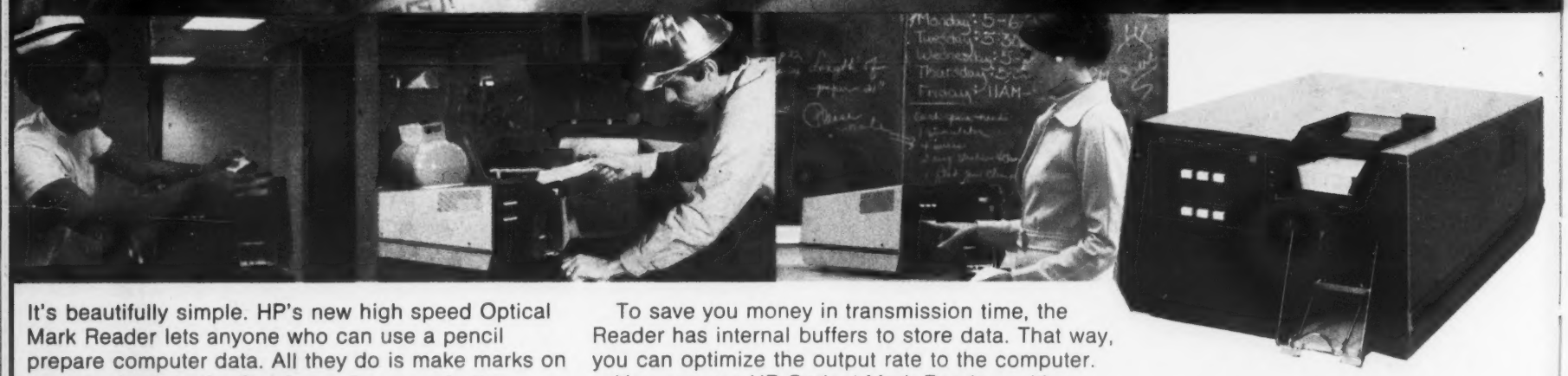

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COMPUTER INDUSTRY

'You Can't Have It Both Ways'

Restructure or Face Regulation, Hart Warns Industry

'Procompetitive' Legislation Needed

By E. Drake Lundell Jr.
Of the CW Staff

NEW YORK – If the computer industry is not restructured, it will face direct government regulation, Sen. Philip Hart (D-Mich.) told the keynote session of the NCC/73 here last week.

The only "alternative to restructuring," Hart told the estimated 2,000 attendees at the keynote session, "will be direct government control. You can't have it both ways."

Hart defended his Industrial Reorganization Act, which identifies concentrated industries and calls for their restructuring by a special commission and special court that would be established under the terms of the bill.

CW Photos by V.J. Farmer

Sen. Hart makes a point at the keynote session.

The computer industry is one of the seven concentrated industries identified by name in the bill, which defines "concentrated" as any industry where the top four firms control over 50% of the market or where any one company accounts for more than 15% of the revenues of any industry.

Hart noted that testimony before his Senate Antitrust and Monopoly Subcommittee by an economic adviser to President Nixon had indicated that "free enterprise is dead" and that within 10 years "our entire economic system would be regulated directly or indirectly by the government – with major sections nationalized."

However, Hart said that while the free enterprise system is dead already in some areas of the economy, "I don't think it's beyond resurrecting.

"And the medicine I would prescribe is a very large dose of antitrust."

But he said the antitrust law today is pretty much a theory that "gets many kind words and very few true believers."

There has not been one piece of "procompetitive" legislation passed by either house of Congress in the past 20 years, while at the same time there have been several measures passed that actually hurt competition, he added.

At the same time he claimed in several areas overseas there was a great deal of activity in the antimonopoly area and this action was helping those areas to boost their productivity and consequently their trading effectiveness.

Concentration of industry leads to technological stagnation, Hart said, even though he noted the U.S. still maintains a technological lead over the rest of the world in the computer field.

"It seems to me that wise public policy means achieving and maintaining a competitive – a truly competitive – data processing industry. It does not mean some kind of public utility regulation for this industry," Hart stated.

He introduced the Industrial Reorganization Act, Hart said, because he wanted to avoid this type of regulation of industry and said he looked on the bill as a sort of "Marshall Plan" for the U.S.

At the same time, however the present structure of the bill is by no means final and it will develop, he added, as more hearings are held.

But, Hart said, he is for the basic policy outlined in the bill. "I strongly believe there are certain sectors of our economy which are not as competitive as they ought to be and that we should do something to correct this."

The giant companies in business, he said, do not have a lock on research and advancing technology. Hart said he was convinced that "technical efficiency, inventiveness and innovativeness are not monopolies of giant corporations.

"In fact, a glance at some of our more concentrated industries will show the very comfort of concentration destroys the incentive for efficiency and innovativeness.

"Certainly," he continued, "the EDP industry is illustrative of this point. Significant innovations have been produced by smaller firms as well as by the largest."

In conclusion, he explained that "some of you may decide that my bill's greatest weakness is its conservative nature. If you want a quick and easy solution to today's monopoly problems, you will have to look elsewhere for staggering proposals."

The senator holds an informal interview after his address.

IBM Sought Trust Hearing Delay

NEW YORK – Sen. Philip Hart confirmed last week that IBM had requested his Senate Antitrust and Monopoly Subcommittee delay its planned hearings into the computer industry.

But, he added, IBM did not request that the hearings never be held, only that they be delayed a while.

Former Attorney General Nicholas Katzenbach, now IBM general counsel, met with him on the subject, Hart said, and noted the IBM legal staff was extremely busy with the many cases against the firm and it would be hard for it to participate in the hearings if they were not delayed.

In addition, Hart said the IBM lawyers were concerned adverse publicity might come out of the hearings coincidental with the IBM-Telex case.

Some sources had indicated early in the year the hearings on the computer industry might begin as early as this spring, but Hart said no industry hearings would be held before fall.

OEM, End-User Exhibitors Delighted by NCC Reception

Quality, Number of Prospects Pleasing

By E. Drake Lundell Jr.
Of the CW Staff

NEW YORK – OEM exhibitors seemed generally pleased with both the size and quality of the crowd at the NCC/73 with the reaction running from "excellent" to "very good."

In general, their counterparts on the end-user marketing side showed much the same reaction, with a few pockets of discontent.

Glenn Lutat, a marketing man from Iomec, said the firm had been seeing "excellent" prospects for its OEM products – which were the largest part of the display and the firm's product line – but added the reaction to the firm's one end-user offering at the show was also getting a good reception.

Lutat noted the quality was exceptional with the people asking "hard questions."

'Fantastic' Show

The show was "fantastic" in the view of Jared Anderson, president of Decision, Inc., which introduced a new OEM OCR reader at the show – the 7600 which carries a price tag as low as $30,000 in 100-lot quantities.

He said the firm was making contacts with high-level people in each of the three areas in which it expects to sell the system – the key-entry people, plug-to-plug equipment manufacturers and OEMs interested in development of systems for selected applications.

Decision is delighted by the reaction it has been getting from these decision makers, Anderson indicated, noting the show might help the firm close several deals it had been working on.

Ralph Gabai, marketing man from Lockheed, said "we are seeing good numbers of people – and they seem to be people that we would not be seeing otherwise." But at the same time he noted that most of the good contacts seemed to be drawn to the exhibit from a Lockheed campaign aimed at drawing those prospects to the exhibits and not just from walk-ins.

However, another OEM exhibitor, Dick McGuigan, OEM sales manager at Decision Data, Inc., noted that the show had been a "little slow" in the first part of the week, but felt the slowness might be caused by the drawn-out nature of the show as compared with the three-day affairs in the past.

At the same time, he said the firm had been seeing some "good" OEM prospects on the floor, and he felt it would probably see as many people over the five days as it had before in the three-day shows.

"With the five-day schedule, it seems the crowd is more drawn out than it was

(Continued on Page 43)

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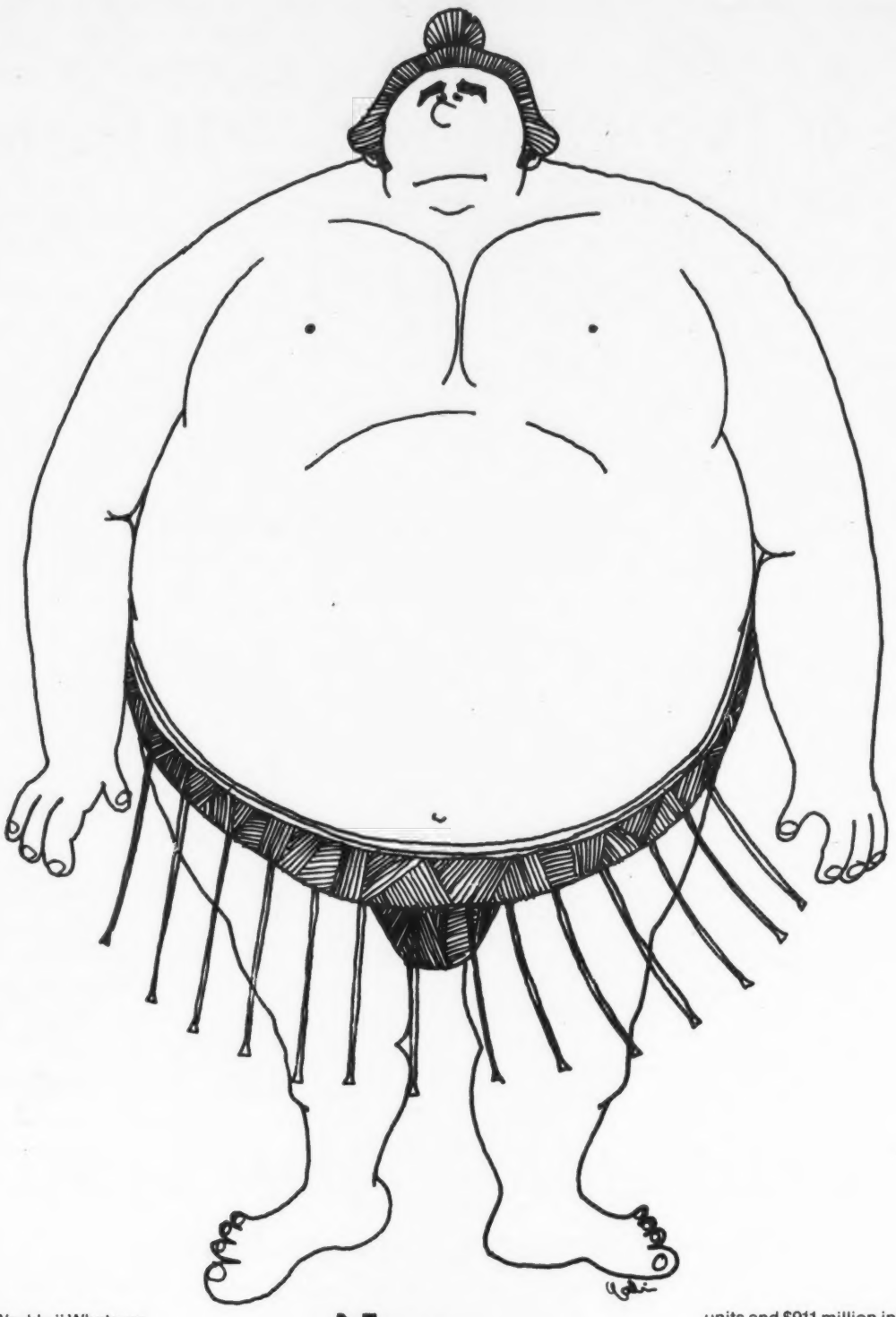

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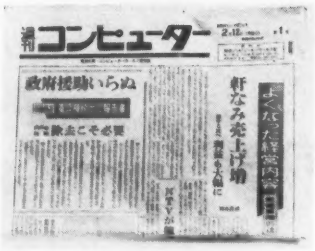

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OEM and End-User Exhibitors Pleased at NCC Crowd Reception

(Continued from Page 41)

in the earlier Joints where everybody crowded into the display area on the first two days. I don't know whether this is better or not, but it sure is more tiring," he said.

Another exhibitor said the longer show was a definite help. "It's given us more time to talk to interested contacts," he said. "It's amazing how many people are coming back to talk to us seriously after making their first quick tour of the floor. Sometimes before, they didn't have time to come back and get more than a brief introduction to the system."

Gary Cain of EM&M said the show was allowing his firm to get more exposure with the end-user public and it had been seeing more end-user contacts than OEM ones, even though the firm makes products for both sides of the industry.

Bill Ford, marketing vice-president at General Automation, claimed the crowd had been "pretty good" on both the OEM and end-user side. "We're getting all types of people," he noted, stating that OEM and end-user interest was high.

Paul Lobell of ICC/Milgo felt the show had been "damn good" for the firm and he had been "busy all day long." Even on Monday when the show was supposed to close at 8 p.m., he said he had been busy in the booth with prospects up until 8:30, when they had to leave.

While most of the OEM exhibitors were definitely happy with the crowd and the quality, a few of the end-user companies were somewhat pessimistic, even though most of them also seemed pleased with the results of the show.

"We don't seem to be seeing as many of the end users as we expected," one said. "Most of the people who seem to be coming by are either competitors or people who want to become our suppliers."

Marketplace, Not Government, Seen Strongest 'Giant' Killer

NEW YORK – The marketplace is more likely to diminish the power and position of IBM in the computer industry than is the government, Judge Lee Loevinger told an NCC/73 session on "Regulation of the Computer/Communications Industry."

Loevinger, who has been chief of the Justice Department's Antitrust Division, a Federal Communications Commission commissioner, in addition to a judge in Minnesota, is now in private law practice.

He said antitrust actions by working with market forces to bring relief in monopoly industries will be successful.

If the market conditions are not right at the time of any antitrust action or settlement, the relief proposed by the courts will not be effective, he indicated.

The best way for the government to act, he said, would be to relax its regulations on industry instead of developing new regulations for new industries.

At the same session, Dan McGurk, president of the Computer Industry Association, echoed Sen. Philip Hart's keynote speech when he warned that the DP industry presently faces the choice between restructuring itself and government regulation.

But McGurk indicated neither solution would be really satisfactory, because a restructuring that could come out of the government's antitrust suit against IBM would probably not come about for 10 or 15 years, if it goes all the way to trial.

Panelists Are Split Over Bell Motivation For Recent Filings

By E. Drake Lundell Jr.
Of the CW Staff

NEW YORK – The firms which early on espoused competition in the data communications industry, "have become the new protectionists," George E. Ashley, general counsel for New York Telephone, told an NCC/73 session on "Regulation of the Computer/Communications Industry."

He claimed the new specialized common carriers had been fighting all of the Bell filings in recent years that would have lowered the costs of services to data users.

However, William Melody, a professor at the University of Pennsylvania, indicated Bell was just lowering rates in those areas where it did have competition and not across the board.

In fact, he said, the rates were being raised in those areas where there was no competition to make up for the loss of revenues in the areas where there were cuts.

Accusing Bell of "predatory" pricing, he said Bell was filing the lower rates just to drive out competition in the few areas where there was some competition.

Both Melody and Ashley agreed, however, that the goal of competition should be to lower the costs of communications services for the end user.

"What was intended to be an opening of a regulated industry to something more akin to the free play of supply and demand with decisions made by market forces has instead become a procedural morass of incredible complexity," Ashley said.

Protecting the Young

"The public in general, and the data processing industry in particular, will be the losers if, in order to protect 'infant industries' and to enforce an artificial division of the market, the efforts of the Bell Companies to continue to be responsive to customer needs are hobbled and delayed, or, perhaps, even prevented," he added.

Bell Companies "are encountering opposition at every turn," he noted, "primarily from competitors who so recently extolled the virtues of free entry and a free market."

He said the communications industry was at a "crucial point" in its development, and he indicated "the data processing industry has an important stake in having government policies and the regulatory process facilitate and not impede these developments."

Melody, however, indicated that if Bell was successful in driving out its infant competition, then it might end up regulating the industry.

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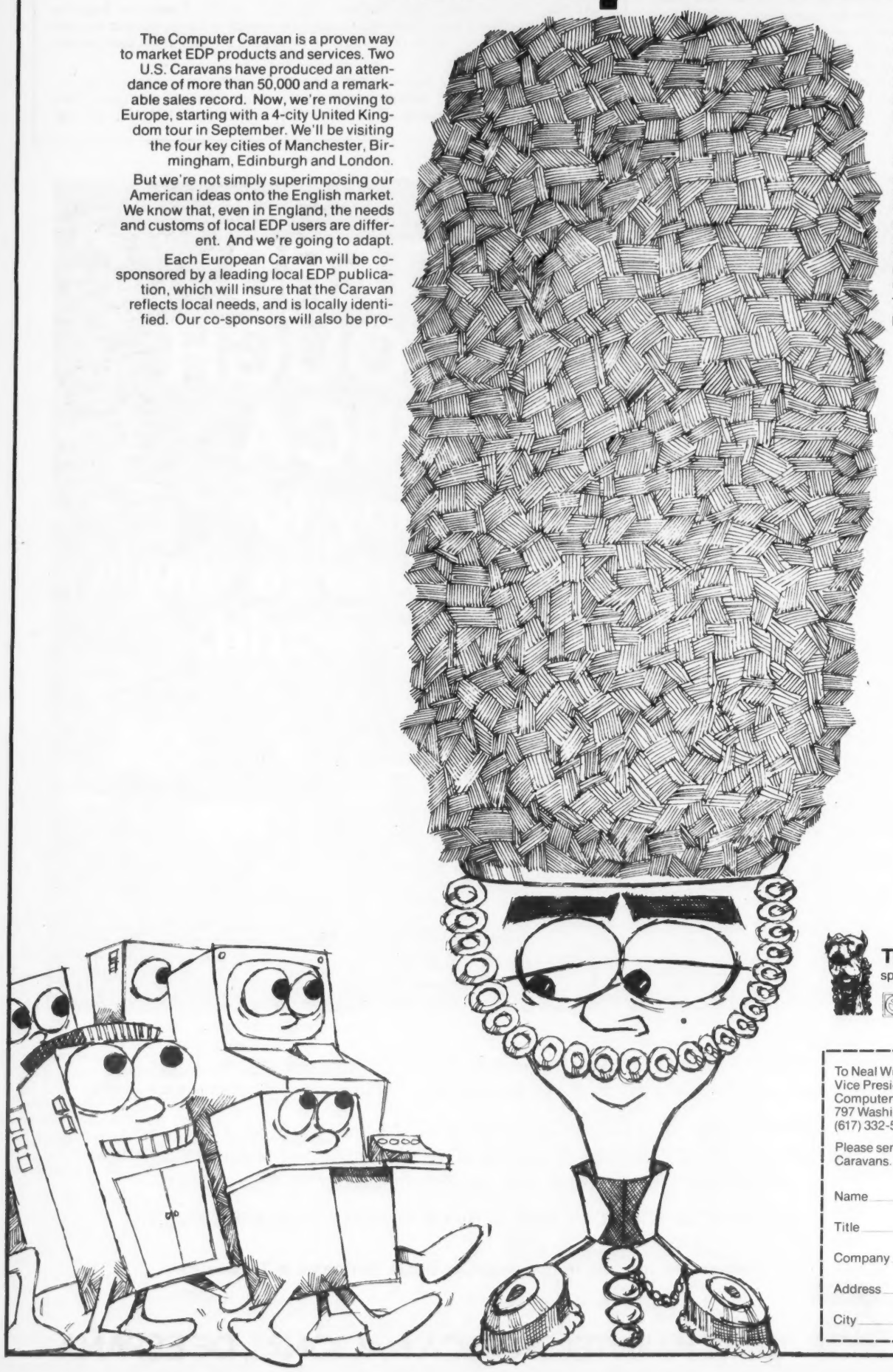

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DP Around the World

Japan Entering 'Integration' Era

By Peggy Zientara
Of the CW Staff

NEW YORK – The use of computers in Japan is entering a new era, with former "islands" now moving into totally integrated systems, according to Shohei Kurita, manager of the research department of the Japan Electronic Computer Co.

There is a trend toward diversification, toward the use of mixed hardware, and, Kurita claimed, "a proper regard for systems analysis must be maintained to avoid general confusion."

Speaking at an NCC session on "Computer Use Around the World," Kurita said Japan had 14,806 installations of general-purpose computers as of Sept. 30, 1972 and 1,670 minicomputer units as of Dec. 31, 1971.

The banking industry is Japan's largest user of data processing, with 15.6% of the total installed computers (with 55% of those on-line); and the electronic machinery manufacturers come in second with 13.6%, according to Kurita.

In the minicomputer area, the electric and electronic equipment industry claims 22.8% of the installations, colleges and universities 15.3%, iron and steel industries 5.7%, and the chemical and petroleum industry 5.1%.

The typical computer installation in Japan spends 40.3% of its budget on rental costs, 28.9% on personnel, 21.8% on miscellaneous costs and depreciation accounts for 9.0%.

"By March of 1977, $12.7 billion worth of general-purpose computers are expected to be installed. That figure is 4.4 times the present volume of installations in Japan, and 2.5% of Japan's GNP for fiscal 1976," according to Kurita.

Non-Developed Nations

Valmor Bratz of IBM do Brasil Ltda. spoke as the only representative of a non-developed region and cited the substantial lack of quantitative and relevant information concerning Latin America as one of the chief problems in studying the topic of computer use there.

Bratz chose the four countries that make up 75% of Latin America's gross international product and gave figures for their December 1972 installed computer-base. According to Bratz, Brazil had 900 (one-third of the total); Argentina, 460; Mexico, 400; and Venezuela, 300. "These figures are only estimates, however, since there is no official data on the subject," Bratz noted.

The major constraints in Latin American DP are the technical infrastructure (as in teleprocessing, where needed reliable telephone lines are hard to find); lack of applications-oriented experienced manpower; management whose decision-making methods are traditional in the midst of an advanced technology; and government restrictions on imports.

Since there are no national manufacturers in Latin America, the countries must import, and most can't afford the heavy import costs. A $300,000 computer bought in the U.S. would cost a Latin American about $500,000, according to Bruce Gilchrist of Afips, the session chairman.

Europe vs. U.S.

Hans P. Gassmann, head of the international studies unit of the Organization for Economic Cooperation and Development (OECD), compared the Western European countries of France, the Federal Republic of Germany, Italy and the United Kingdom with the U.S. in several categories.

At the end of 1971, he said, the U.S. had 84,600 computers installed compared with the Western European countries which all had between 3,400 and 7,800. The average value of systems was $28.9 billion in the U.S. and $1.2 billion-$2.8 billion in Western Europe.

In the number of EDP systems, number of companies/million of working population and value of installations, the U.S. came out far ahead of Western Europe, according to Gassmann's figures.

Barry Boehm, an executive with Rand Corp. spoke on the internal technology of the Soviet Union and Eastern Europe, discussing the BESM-6 (the largest Soviet computer), the Minsk-32 (the "real workhorse") and the Ryad series of computers.

Boehm said there are problems with the Ryad series in the Soviet Union and no one knows when the top-end models 50 and 60 will come out. He said the Soviets haven't mastered the production of peripherals, and production is way behind schedule.

"The usage and demand for computers is centralized," Boehm said, "with Poland and Czechoslovakia having about 500 computers between them." In real-time systems, there is a big demand for process control. There is an airline reservation system in Moscow, but elsewhere the process is entirely manual.

"The Soviet balance of trade was negative last year, which intensifies the general reluctance to buy West," according to Boehm.

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'Lawyers Need Help'

Software Protection? Users Must Chart a New Course

By Edward J. Bride
Of the CW Staff

NEW YORK – New legislation reflecting new thinking is needed to protect computer software. The problem is: who should do the thinking?

This attitude was the unanimous conclusion of five lawyers who comprised a panel on "Legal Protection for Software" during last week's NCC.

Claiming attorneys are not clever or innovative, but are more like "scribes" who translate thoughts into writing, attorney Roger M. Milgrim said the people most affected by software problems should chart the course for the new laws.

Help Lawyers

Milgrim noted users and people in the computer industry know the problems of software including the difficulties of enforcing patent laws. These people should communicate their needs to lawyers, who could help draft legislation to end the current uncertainty regarding the patentability of computer programs.

When the Supreme Court overturned the Benson-Tabbot patent, the only assertion in the ruling was that mathematical processes are not patentable, and this was merely a reassertion of past policy, according to IBM patent attorney Elmer Galbi.

The Benson-Tabbot program helped convert BCD data to binary, panelists recalled, agreeing this particular program was not suitable for a broader ruling (on machine processes that can be accomplished by a digital computer).

The Supreme Court clearly "threw the ball to Congress" when it said that if programs are to be protected, new legislation might be required, Galbi noted.

The patent system has a place in our society, Galbi continued, stating the system needs a broad overhaul so it can work. "Since I don't see a general overhaul" in the making, the next best thing would be "specific legislation," he added.

Technological Interchange

William Keefauver, the Bell Telephone Laboratories' lawyer who lost the Benson-Tabbot decision, agreed that what is needed is a system that encourages technological interchange, one that has more than "prestige" as a dividend.

He dislikes the IBM suggestion of a "registration" system for programs, noting the "inventive, imaginative" portions would be placed in the public domain – only the coding would be protected, and this type of effort is "trivial" compared with systems design, he said.

Keefauver also suggested the Supreme Court decision was "disappointing thinking to legal scholars" because of its narrowness. "Most of the major questions remain unanswered," he said.

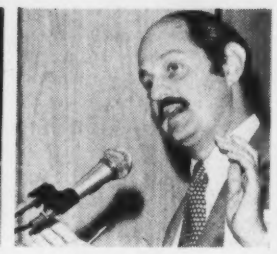
Attorney Morton Goldberg claimed computer programs are "writings" under the Constitution, and they are therefore eligible for copyright protection (several hundred programs are currently copyrighted, according to the U.S. Patent Office).

The weakness, however, is that only copying is prohibited, while unauthorized use of material is not covered by copyright laws, Goldberg suggested.

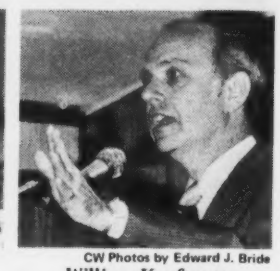
Martin Goetz, a software designer and software patent holder, reminded the panelists the true subject of a software patent is a "machine process" and not a writing. From the audience Goetz suggested that copyright is not a valid form of protection for programs.

Panelists also suggested that trade secrets provide some protection, but enforcing this type of protection is just as expensive as enforcing a patent. The advantage of this approach is that a trade secret costs nothing additional: it is automatically applied when the work is completed. It is also applicable immediately upon completion, while patents can take from two to five years to attain..

Elmer Galbi



Roger Milgrim



CW Photos by Edward J. Bride
William Keefauver

A Voice Alone

The "sad" aspect of the Benson-Tabbot decision, according to Milgrim, was that the court had no help except from interested parties.

He philosophized that software is "new in our society." There is very little that people do today that is not related in some way to a computer, he said.

"Like IBM has been saying for some time," he continued, "perhaps we need to look at this as a new problem," rather than thinking which of the three forms of protection (patent, copyright, trade secret) is best.

Air Traffic Under Control

SAN DIEGO, Calif. – The Naval Electronics Laboratory Center (Nelc) is applying previously developed monitoring and diagnostic techniques to a Federal Aviations Administration (FAA) project now underway which seeks to improve air traffic ground systems for commercial airlines and general aviation.

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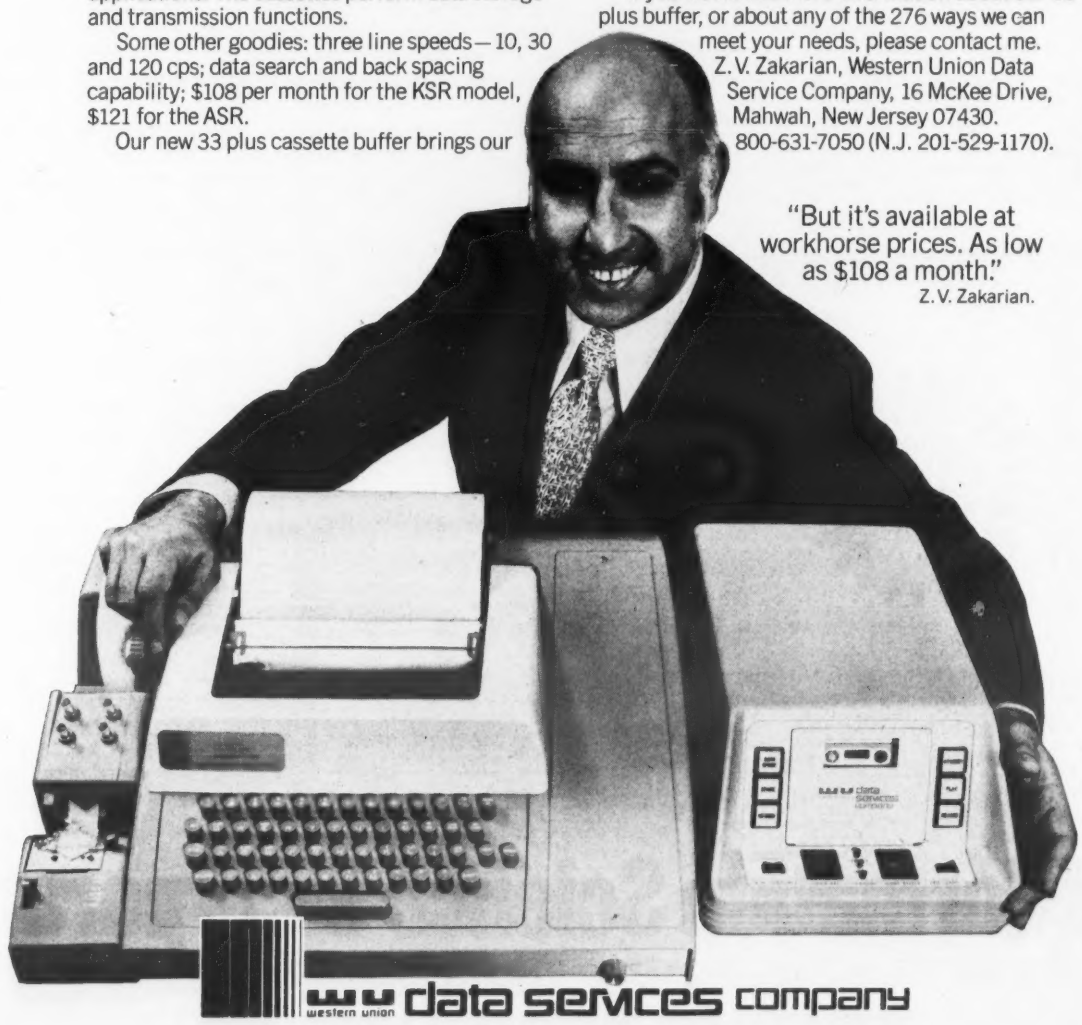

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OEM Products Focus on Storage, Small Systems, CRTs

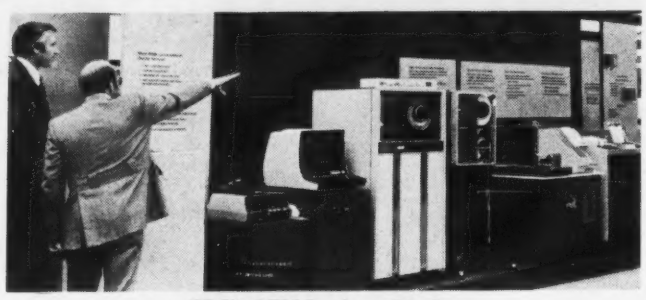
CDC Doubles 3330 Storage

By Ronald A. Frank
and Molly Upton
Of the CW Staff

NEW YORK – Over half the companies at the NCC marketing chiefly to OEMs announced new products or showed products for the first time, with the empahsis primarily on the storage and small systems area.

There was also considerable activity in the CRT area, with several firms adding to their lines or entering that market for the first time.

One of the most significant products for the OEM announced at NCC was CDC's double density 3330-type disk system that is said to have twice the capacity of the IBM system.



CDC's OEM Products Display

The 9780 drive has a pack with 19 recording surfaces and a recording density of 4,040 bit/in. and 400 track/in. These specification coupled with a 30 msec access time add up to a total of 200M bytes of on-line storage, according to CDC. The increase in storage is achieved by "doubling only track density," the company said.

But the drive does lack a controller. CDC estimated it will take about a year to add a "media-compatible" controller to its double density 3330-type drive. The company said it is also developing an integrated version similar to IBM's 3333 drive.

The implication in announcing the drive is that an OEM customer will develop the necessary controller, but CDC spokesman agreed this has yet to be done.

Other CDC products announced included the 92000 magnetic tape drive, available in both 7- and 9-track models with tape speeds of 25-, 37.5- and 50 in./sec and recording densities of 200-, 556-, and 800 bit/in.

OEMers at NCC

The device uses single capstan drive and optical digital tachometer and is rack mountable. Prices range from $3,400 in single quantities to $2,400 in lots of 1,000.

CDC also had a 6,250 bit/in., 200 in./sec tape drive priced at $13,200 in single quantities down to $10,500 in lots of 1,000.

The 92423 CRT features upper and lower case characters, Ascii set and numeric pad. The screen is 80 characters by 8 lines, expandable to 80 by 16, TTY-compatible and is switch-selectable from 75- to 9,600 bit/sec.

The display operates in either scroll or page mode, and links to an optional thermal printer. The CRT costs $2,200 in single quantities and the printer option is $2,100.

Printers Upgraded

The 9322, a 400 line/min drum printer, is an upgrade of the 200 line/min printer of the same series. The unit uses one hammer/two columns instead of the former one hammer/three columns, a spokesman explained. Single unit cost is $7,190.

The 9370 series train printer operates at up to 2,000 line/min and embodies a new hammer bank and improved dc servo control motor for paper feeding, CDC said. The single unit price of $3,500 includes a buffered controller.

The 9400 flexible disk drive records at 3,200 bit/in. and has 76 track/surface. The data transfer rate is 240 kbit/sec and average access time is 20 msec.

The 9740 storage module drive contains 40M byte with data stored on five recording surfaces. Price of a single drive is $3,900.

The 9790 is a 300M-byte unit with 22 non-removable disks containing 40 data surfaces. Data is recorded at 6,000 bit/in. at a density of 192 track/in. Single price is $29,000.

Iomec Unveils Printers, Disks

Iomec was another exhibitor unveiling a number of OEM products, including a mini line printer, disk drives, magnetic tape cartridge system and card reader.

The Series Seven Model 352 prints up to 420 line/min with a 48-character font. Prices range from $9,550 to $5,760 in quantity.

The Series 3000 mini disk drives include both front, top loading and fixed configurations. The 3004 is a front-loading 200 track/in. unit with fixed storage plus a cartridge with total capacity of 96M bit. Average access time is 55 msec. Quantity price is $3,120.

Iomec Series Seven Model 352 Printer

The fixed disk drives range from the 3024 with 24M bits on a single disk to the 3048, with 48M bits on double disks, and

(Continued on Page 49)

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OEMers Bring Products For Storage, Display

(Continued from Page 48)

the 3096, which offers 96M bit on double disks.

Bit density is 2,200 bit/in. and track density is 100 track/in. for the 3024 and 3048, and 200 track/in. for the 3096. Average access time is 55 msec.

A mini magnetic tape cartridge system, the Model 300, comes in one-, two- or three tape transport/panel with prices from $2,240 to $3,250.

The unit uses a "Cartritape" cartridge which stores 912K bits recorded at 400 bit/in.

Iomec also announced three models in the Series Five card readers, the Models 30, 45 and 60, which read at rates of 300- to 600 card/min.

Hoppers hold 500 to 1,000 cards depending on the model. The units are priced from $1,525 from 345 Mathew St., Santa Clara, Calif. 95050.

OCR Unit Shown

Decision, Inc. revealed the OCR 7600, which the firm claims is half the cost of IBM's 3886 Model Two, with faster performance.

The Recognition and Control Processor is supplemented by a floppy disk that permits additional fonts and diagnostics to be added. Editing of "difficult to read" data can be done manually or with a keyboard/CRT station, the firm said.

Options include the ability to read data from typewriters, preprinted forms, computer printing and numeric hand printing, the firm said. The 7600 processes 8-1/2 sheet/min at recognition rates up to 600 char./sec.

Price in lots of 100 is $30,000 from 5601 College Ave., Oakland, Calif. 94618.

Potter Printer Uses Two Moving Parts

Potter unveiled two impact line printers, the LP6150 and the LP6350, operating at 180- and 420 line/min, respectively.

The 132-column units incorporate only two different moving parts, hammers and the new Potter helical platen, with 12 hammers set in a single bank for minimum maintenance, the firm said.

Single unit price for the LP6150 is $3,500 and $2,450 in lots of 1,000. Unit price for the LP6350 is $4,950 and $3,465 in lots of 1,000.

Potter also announced a 3740-compatible floppy disk drive, the DD4740 Diskette Drive. The price drops from $790 in single quantities to $550 in lots of 1,000. The firm is located at 532 Broad Hollow Road, Melville, N.Y. 11746.

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CPU-Independent Unit Converts 80-Column Cards

HORSHAM, Pa. – Decision Data marked its entry into the 80-column card equipment market with its 80- to 96-column card converter and an 80-column card data recorder.

The converter can operate independent of a computer and handles up to 120 card/min. The conversion feature is field installable on 9601 or 9610 data recorders, the company said.

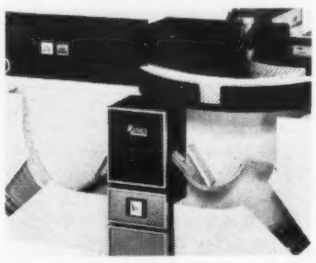
The 8010 data recorder reads at 200 card/min, punches 75 card/min and functions either on- or off-line.

Tape System Uses Cassettes

A punched tape emulator (PTE) using a digital cassette system highlighted the Remex display. The PTE, a dual-cassette deck, reads or writes at a minimum of 300 char./sec and sells for under $2,400 from the Santa Ana, Calif., firm.

The RRS6300 reader/spooler handles up to 350 ft of tape and reads 300 char./sec and rewinds at 1,200 char./sec. The price is $1,195.

A new perforator/reader, the



Remex RAF6375 Paper Tape Reader/Punch

RAF6375 reads up to 300 char./sec and punches 75 char./sec on fan-fold tape. Its price is $2,145.

The RRK2080, a photoelectric punched tape reader, is designed for typesetting applications.

Ampex Upgrades Tape Unit

Ampex's OEM products included a new tape memory model B (TMB) that handles 10- to 50 in./sec and sells for about $3,500 in single quantities. It features retractor arms and single capstan drive. The unit is basically an upgrade of the TMZ, which operates at 37.5 in./sec, a spokesman said.

The DE 800 is a phase-encoded NRZI format control unit designed for use with the TMB or other smaller tape drives. It is priced at under $3,000 from the Marina del Rey, Calif., firm.

Other OEM Products

Teleprocessing Industries, Inc., a subsidiary of Western Union Corp., showed its new Peripheral Device Switch, Model S1000, which can handle up to 98 lines in a 2 by 2 arrangement. The unit can switch communications lines, I/O channels to peripherals or peripheral units between computers.

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Canberra Industries, Inc., Meriden, Conn., showed its Model 2020 cassette tape mass storage system. The unit handles three cassettes and operates up to 140 in./sec. Interfaces are available for the PDP-8, 11 and Nova, the firm said.

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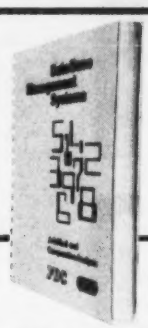
Omron Systems Inc., Sunny-

(Continued from Page 48)



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Storage, Displays Spark OEM Exhibits

(Continued from Page 49)

vale, Calif., showed its 8025 programmable CRT, which contains 2K of refresh memory and is available with up to 16K. The basic unit includes a microprocessor, program ROM, display RAM, Ascii keyboard and numeric pad, and RS-232C interface. The 15-in. diagonal screen shows 80 char./line and 24 lines.

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The Vistar/GT CRT terminal from Infoton, Inc., Burlington, Mass., sells for $1,595, with a switchable transfer rate from 75- to 9,600 bit/sec. The basic unit includes keyboard, display, control and refresh power supply and RS-232C and current loop interfaces.

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Megadata Computer and Communications Co., Deer Park, N.Y., displayed its Mac-Net terminals, including one that sells for $4,850, as well as its SR-1000C color graphics display terminal, featuring over 150 graphic characters in four to seven colors. The display is on a Sony television screen. Prices range from $2,900 to $5,000.

The firm also showed a printed circuit card CRT/8 that plugs into a slot on the PDP-8E, F or M, and includes an executive monitor program in paper tape. The card is priced at $770.

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Adage, Boston, Mass., introduced the Adage/400 graphic display system, with a controller and microprocessor using ROM. The unit can handle dynamic graphics and line drawing. Prices range from $30,000 to $50,000.

The Adage/200 is designed for multi-terminal graphics applications, and the TV raster screens can display 2,400 characters and store 3,800.

– – –

Imlac Corp.'s PDS-4 graphics display system includes a mini with 4K to 32K memory, display processor, 17-in. screen, alphanumeric keyboard and RS232 interface. Software including a Fortran IV compiler is available, as well as a floating point feature, the firm said. Peripherals available include light pen, tablet and joystick. The basic system price is under $14,000, the Needham, Mass., firm said.

– – –

Caelus Memories Inc., San Jose, Calif., showed its new 103 fixed disk drive, which has 100 track/in. for a capacity of 24M bits. Average access time is 75 msec.

Up to four units can be daisy-chained. The single unit price is $1,800.

The 306/2 disk drive has 200 track/in., with one fixed and one removable disk. The 96M-bit unit's average access time is 35 msec. In quantities the price is $4,000.

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Electronic Memories and Magnetics (EMM), Hawthorne, Calif., had a new Micro 3000 16K-by 20 board that offers a 650 nsec cycle time and 300 nsec access time, and is pin-compatible with the older 3000 8K board.

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Another firm showing a 16K by 20 board was Standard Memories, Ft. Lauderdale, Fla., which calls its unit the 16 EcomH. The 3-wire 3d board is pin-compatible with the EMM 3000 and sells for $2,400 in quantities.

– – –

Hewlett-Packard, Cupertino, Calif., showed for the first time its writable control store board for the 2100 Series, which sells for $3,500. It also offers a Prom writer that fuses chips for $500.

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Data Products, Woodland Hills, Calif., said it has made significant changes since introducing its Charaband printer. The Model 2550 prints at 1,250- to 1,550 line/min and single unit price is $23,000.

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Intel Corp. introduced two modular microcomputer development systems, the Intellec 4 and 8, designed to aid in the

(Continued on Page 51)

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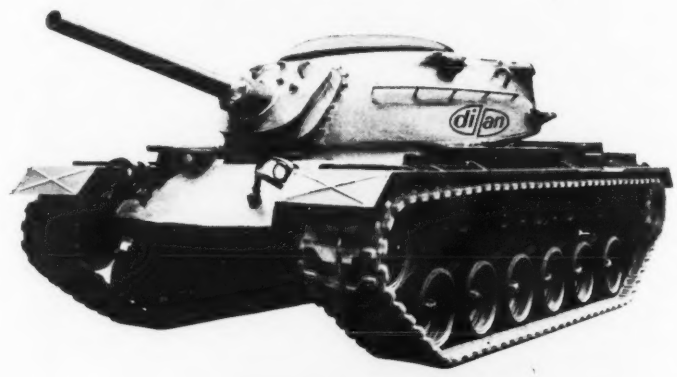

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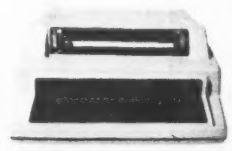

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For Entry-Level Programming

ACM DP Curriculum Leans Toward Business

By Patrick Ward
Of the CW Staff

NEW YORK – The Association for Computing Machinery unveiled a business-oriented undergraduate DP curriculum at the NCC that is designed to prepare students for entry-level programming work.

The report was written by a subcommittee of ACM's Curriculum Committee on Computer Education for Management and Prof. J. Daniel Couger, chairman of the subcommittee, outlined the report:

- It is divided into two concentrations or options: the technological, usually for engineering majors, and the organizational, typically for business majors.
- Of the 11 courses required for the two undergraduate programs, six are undergraduate versions of the graduate courses the ACM recommended in a report a year ago.
- Both concentrations require the student to take courses in operations analysis and modeling, systems concepts and implications, information system analysis and system design and implementation.
- Students in the business concentration would also take courses in human and organizational behavior, programming structures and techniques and computerware.
- Those in the technological concentration, designed to give students a more in-depth exposure to computers and programming techniques, will take courses in information structures, computer systems, file and communication systems and software design.

One-Year Master's?

Graduates of ACM's undergraduate program could attain a master's degree in an ACM-recommended curriculum in one year rather than in two, Couger said.

"We are talking about introducing seven courses into the standard business curriculum and eight into engineering," Couger explained.

One attendee pointed out that this could create a "scheduling nightmare," especially if the required courses were offered in various departments, as Couger suggested they might be.

Prof. George Gorsline, a professor of computer science at the Virginia Polytechnic and State University, said he was "positive" about this degree program but had a few words of criticism.

"This degree as outlined really depends on a post-graduate apprenticeship," he said. Gorsline recommended a cooperative plan or a work-study solution instead.

He also said he hoped this new undergraduate curriculum plan would not cause the core of the master's curriculum to fall into the baccalaureate courses. He said he expects master's programs to be upgraded.

Couger explained that he saw the master's program as taking experienced people and training them for a career, rather than for entry-level work.

Tapes, Disks, CRTs Highlight OEMs

(Continued from Page 5)

design of the fim's MCS-4 and MCS-8 OEM systems. With the units all program storage can be on RAMs rather than ROMs. Prices start at $2,195 and include CPU, memory, I/O, crystal clock, TTY interface and power supplies.

Also available are standard cards designed around the MCS-4 and MCS-8 microcomputer sets.

A portable analyzer, for the MCS-4, was also introduced.

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Vermont Research's new product was the 3016 drum memory that has a capacity of 32M bits.

Service Links Securities Trade

NEW YORK – A program designed to link all parties to an institutional trade has been developed by the Central Certificate Service, Inc. (CCS), a subsidiary of the New York Stock Exchange that serves as a securities depository.

Called Institutional PDQ, the program will link electronically the broker-dealer, institution and the institution's agent bank to confirm the trade, issue delivery instructions and deliver the positions automatically through CCS.

After the broker-dealer supplies CCS a computer tape containing the information necessary to confirm a trade, CCS transmits this information to the institution, while making a hard copy. The institution will validate the confirmation to CCS, its broker and its agent bank.

This information is input to CCS' computer and deliver or receive instructions for the agent bank and the broker are produced. The positions are then delivered automatically through CCS.

"This program should alleviate one of the nagging problems of the securities industry – rejection of security deliveries because instructions to receive are misplaced, lost or delayed in transit," observed President Diran M. Kaloostian.

The program is being tested with the cooperation of Chase Manhattan Bank.

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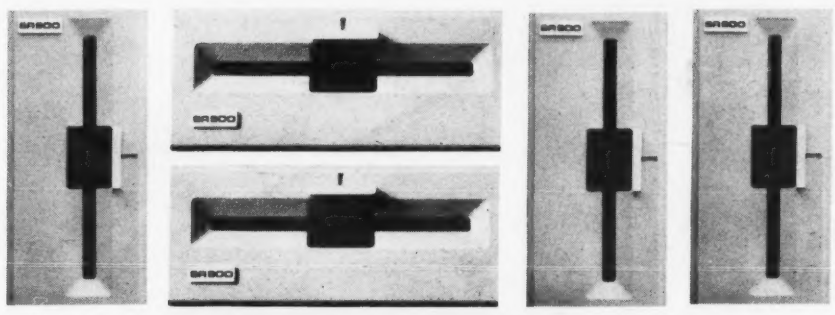

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Greyhound's 'Top Dog' Sees Lessors Unresponsive to IBM

By E. Drake Lundell Jr.
Of the CW Staff

NEW YORK – "We don't like the way most of the leasing market has been going," Olie Swanky, president of Greyhound Computer Corp., said in an interview last week, "because most of the firms aren't doing anything to better their condition."

Greyhound introduced at the NCC/73 here an upgraded 360/30 with the capacity of a 370/145 and renamed it the Phoenix system.

"We put a different label on the system to indicate it is a truly different system," Swanky said. "Many users when they hear of an upgraded 30 think it is impossible since IBM determined the limits for the system.

"By giving it a different name, we are trying to show it is a completely new device – in hardware, software and support."

He said the acceptance of the new name for the system and of the change it represented had been demonstrated at the show.

"We're trying to sell the idea of price/performance, and that is what gets to the vice-presidents of finance and presidents of companies," he said.

Challenge Accepted

In addition, he said, several users had accepted Greyhound's invitation to actually bring in their programs and run them on the Phoenix system on the floor of the exhibit and to compare those results against the results they were getting from their in-house systems.

He said one user had even brought in a monitor for the system to monitor its performance as it operated on the floor.

The quality of the people testing the system at the show was "good," he said, noting most of them were presently using the lower end of the 360 line.

But the whole move to introducing the enhanced system, he said, was brought about because of the problems facing the leasing industry today.

The industry at present, he said, was "nickel and diming" itself to death with price-cutting actions.

At the same time, he said, most of the firms in the business were doing little long-term planning for the future, instead concentrating on "making the mortgage payments."

Many of the firms, he said, are "almost insolvent" and he predicted there would be a great deal of consolidation in the business during the next year, with the more viable firms picking up the inventory of the less financially secure companies.

About IBM . . .

Swanky believed that the industry had largely brought this on itself because it had concentrated on competing with each other and not with IBM, but he said IBM was definitely the firm that was supplying the major competition for the firms in the business, not the other leasing companies.

In conclusion, he noted there was still "a lot of mileage left in the 360 hardware" and the key to increasing usage would be in developing increasingly sophisticated software for the systems that are enhanced beyond the IBM-imposed limits.

Lack of Technology Breakthroughs Seen A Sign of the Times

By a CW Staff Writer

NEW YORK – Several industry observers at the NCC/73 commented on the seemingly low level of innovations shown on the floor.

"Even though there are a lot of new products here," one said, "most of them are just improvements in existing products or fill-ins for existing product lines. There seems to be less really new technologically than at some of the past joint conferences.

"I guess," he said, "that these shows just aren't the place for technological breakthroughs any more, but I don't know where that type of product would be shown."

Sign of the Times

However, another source said the slowdown in technological innovations on the exhibit floor just reflected the current state of the computer industry.

"I know many people expected to see a lot of the latest technological gems here," he said, "since it is the only show of the year. But I think the industry has stabilized to an extent in the last six months and the breakthroughs just aren't there today."

Another long-term industry observer noted it had been two years since the introduction of the 370 line and most of the industry had already reacted to it, so the new technological products associated with it had already been introduced.

He indicated the next big surge of major introductions would probably come in a year or two when the independent suppliers begin introducing a wave of products to improve the 370 line rather than just making duplicates of the IBM products.

"There's still a lot of work being done in the labs around the country, but the market just isn't ready yet for a new wave of technology right now. It will take a couple of years," he concluded.

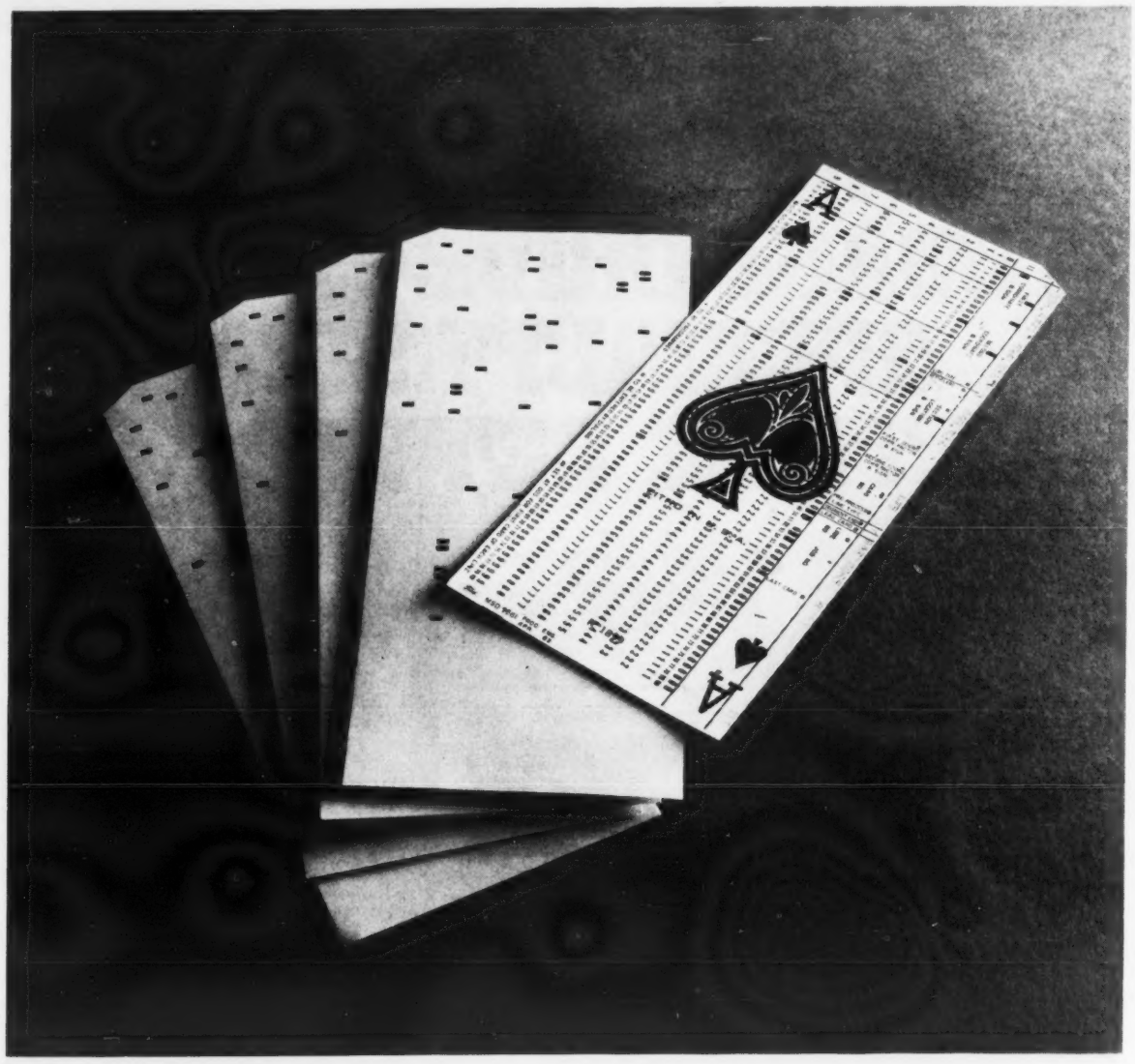
Gloomy Outlook

The gloomy economic outlook for the rest of this year, however, may have scared off some firms from making the large investments needed to bring some of the new developments to the market, some other observers believe.

"After all," one said, "who wants to make a large economic investment in developing and marketing a new product, if the bottom is going to drop out of the economy and users are going to stop buying in six months?"

Another source agreed with this assessment, but he indicated that while the signs were bad at the present, he wasn't at all sure that the downturn would in fact come, even though he agreed that many in the business expected it next year.

"I think they might be worrying too much because of the current climate, but only time will tell whether they or I are right," he said.



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Integrated Technologies Called Vital to User Needs

By Ronald A. Frank
Of the CW Staff

NEW YORK – The specialized common carriers will have to provide communications users with a wide range of services in order to be responsive to their needs.

The new carriers will have to consider using an integrated combination of line-sharing technologies, according to Alex Latker, director of data transmission at Microwave Communications, Inc.

The World of Specialized Carriers

Speaking at an NCC session dealing with the impact of networking, Latker said the specialized carriers should offer services ranging from conventional frequency-division and time-division multiplexing (FDM and TDM) to "concentration-oriented methods" like dynamic multiplexing, computer-controlled electronic circuit switching and message-switching such as packet-switched technology.

Variable Delays

One disadvantage of message- and packet-switching is the random and variable nature of the delay experienced by each message passing through the network. And response times in packet-switched networks are very "sensitive to heavy traffic loads," Latker said.

But with circuit switching nets or dynamic TDM systems, the delay does not depend significantly on the overall traffic in the network, he said.

Based on these types of trade-offs, the communications user will probably have to utilize a variety of conventional and shared services to optimize his communications capabilities, Latker said.

In order to provide users with the required services – value-added offerings beyond those now generally available – the specialized carriers will have to provide error control, code conversion, data speed changing, data concentration, message routing and related capabilities.

To implement some of these projected user needs, MCI is considering three major types of value-added services, Latker said.

The first is a throughput maximizer service which would include the addition of carrier-supplied hardware to buffer and format CPU output before and after transmission.

This service would be "highly customized" and the costs will depend on the amount of features selected by the user. Among these features will be user-selected block lengths, transmission protocols, code formats, interfaces and similar considerations.

Two types of error correction would be included in the customized service. The first would be automatic-request-repeat for high accuracy applications. The second would be forward error control for less demanding nets.

The second type of service would be for shared operation of carrier facilities by a number of users with varying bandwidths, traffic loads, message priorities, terminal types and line control techniques.

The shared operation would have four priority levels including interactive mode for messages which have to arrive "within 10 seconds." A fast batch service would include delivery of a message within three minutes. A regular batch service would include delivery of a message within 60 minutes, and bulk service would provide for delivery of the customer's messages on an overnight basis.

For the shared operation with its varying priorities, the user would be charged on a time, message length and transmission priority basis.

The third type of service would duplicate the offerings of the second type with the addition of a capability to deliver a message to any location instead of to only a fixed destination.

The shared offerings that become feasible with value-added nets would appeal to the smaller communications users who cannot justify an in-house system with dedicated equipment, Latker said.

The major difference between the existing carrier services and the value-added nets would be the transparency, he said. This term refers to the fact that a user of an existing service receives the same message as the one that was transmitted.

This would be contrasted with the value-added nets that will be able to alter data depending on the user's needs.

The projected services could not be offered unless MCI (or another carrier) gets approval from the Federal Communications Commission.

3d Generation CPUs Highlight USSR Show

Novosti Press Agency

MOSCOW – Six members of the ES series of third generation computers highlighted the recent USSR Permanent Exhibition of Economic Achievements.

The systems, developed through the joint efforts of six socialist states, are founded on a common structural, technological and electronic basis, are program-compatible and use standardized peripherals.

Advances in the design of controllers have made possible multiprogramming and the machines accept remote job entry.

The machines on display included the ES-1010, produced in Hungary, the ES-1020, the USSR and Bulgaria; ES-1021, Czechoslovakia; ES-1030, the USSR and Poland; ES-1040, German Democratic Republic; and the ES-1050, the USSR.

There were also 100 varieties of auxiliary devices which help to mount automated systems of various configurations, intended for the solution of a great variety of economic, engineering and research problems.

The variety of standard peripherals facilitates the use of graph constructions in designing.

With the mathematical apparatus and translators, engineers can quickly write the necessary program in an algorithmic language comprehensive to any engineer.

Work to Do

This does not mean, explained V.S. Seminikhin, chairman of the exhibit organizing committee, that the work on the system is over. One of the biggest machines, the ES-1060, is now being designed, and the working group for automated control systems still has a great deal to do to develop a uniform policy of application.

Apparently everyone who comes to the exhibit wants to see the machines in operation. Visitors can see them count the proceeds from a department store, estimate the trajectory of flight of a supersonic plane, play chess fairly well, receive instructions by telephone, and even make jokes and compile horoscopes.

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For Entrepreneur Seeking $, Some Hard Facts...

By Molly Upton
Of the CW Staff

NEW YORK – While the times are hardly auspicious for the financing of young firms, many entrepreneurs showed up at the NCC session on venture capital for the computer industry to hear advice from panelists on the do's and don'ts of obtaining financing.

Entrepreneurial endeavors are not for everyone, cautioned venture capitalist Alan Patrigof of Alan Patrigof Associates.

Long, Rocky Road

Even in good times, the road to bringing an idea to a reality is a long, hard one, and several panelists mentioned the high rate of divorces and personal problems among those who had started their own firms.

Patrigof outlined qualities needed for successful entrepreneurship – a "strong ego, dogmatic confidence, dogged determination to succeed . . . the ability to work with people and meticulous attention to details."

In starting a company, he urged founders to proceed as far as they can on capital raised through friends, relatives and other personal sources before coming to ask for venture capital.

Chances of obtaining capital improve as the business progresses, Patrigof said, especially in the current financial environment, and seeking capital too early would likely mean retaining very little share in the company.

The founder should assemble a core team, preferably of persons who have known each other, and they should include a mix of skills, such as marketing, business and technical.

Dick Brandon, president of Brandon Applied Systems, speaking as one who has gone the entrepreneurial route, also confirmed this advice.

Brandon's assessment of the importance of members of a management team was business management 40%, marketing 40% and technical talent 20%.

Patrigof said that he now attaches even more significance to marketing talent.

Also, it is a good idea to acquaint a venture capitalist with the firm while in its early stages, and get him to "keep a file on your company. You might even wind up having the capitalist ask if he can help you," Patrigof said.

'Be Conservative'

When one decides to search for venture capital money, he should prepare the proposal in the form desired. "Don't innovate," Patrigof said.

Outline specifically what the money will be used for, and detail adequate provision for contingencies, and include possible negative factors. Be as complete as possible, he urged.

However, don't include specific financial plans, as the terms will change very shortly, and this would only make the plan look outdated, he added.

In addition, the entrepreneur should not get "hung up over percentage of control, as control ends up in the hands of the entrepreneur if he's any good," Patrigof mentioned.

Brandon outlined a few more basic principles, such as the necessity of appearing articulate, presentable and calm when searching for capital. "Whatever you do, don't panic," he said.

A thorough resume on the principals in the business and marketing areas is necessary, and the material should not be devoted to technological descriptions.

The capitalist can generally find out about technical achievements of individuals easier than business skills or marketing talent, he said.

Have a reasonable business plan – cut it in half and it will still be optimistic, he noted.

Word Processing + Communications + Data Entry = Multi-Function Success

By a CW Staff Writer

NEW YORK – In the future the world of data entry will be marked by a combination with the world of word processing and communications, a speaker predicted at an NCC session on "Views of the Future."

"The data entry field is rapidly moving to combinations of CRTs, cassettes and printers for source data automation," according to George Bernstein of the Naval Supply Systems Command.

At the same time that the combination comes about between word processing and data entry, there will also be an increased emphasis on communications for the system, he said.

He said that presently much of the equipment for word processing and data entry is basically similar and growing more so every year, but that no firm is yet marketing combination systems to the end user.

"It is obvious that if one piece of equipment can perform three separate functions in an office – and it is not required full time for any one of these functions, then the costs for all three functions can be reduced by sharing the same piece of equipment," Bernstein noted.

"It is reasonable to predict," he added, "that the companies which make keyboard equipment will start to realize that equipment can and should have multiple functions."

In addition, he said users might press for this type of movement since it is obvious they will be able to save money by using the same piece of equipment for many functions and also by volume purchasing.

But while the merger of the three areas must come, Bernstein indicated that over the shorter period there will be changes in the key data entry.

For example, he predicted the buffered keypunches would replace many of the more traditional 80-column card punches in smaller keypunch installations.

Panelists Battle Over Protection Of Software

By Michael Weinstein
Of the CW Staff

Why is the question of software protection under the law so tough to resolve? Why is the present era so unfavorable for any resolution? How, if ever, will this problem be resolved? And considering the present state of limbo regarding software patentability, what should users do?

These were some basic questions asked at an NCC session on "Computing and the Law."

Representing those who felt patentability was a good idea, Philip H. Dorn, a private consultant, stated, "Everyone who develops programs has the right to protection."

In Public Interest

Amplifying this basic right, Robert Jacobs, a lawyer, felt software patents were in the public interest. To demonstrate this mutual benefit Jacobs built a hypothetical case where a software house spends $50,000 to develop a package and $25,000 to market it.

If it can sell the package to 150 users who each pay $1,000, then all benefit: the developer makes a profit and the users get a package for a portion of its development costs.

Jacobs feared that if there was no protection the initial developer would not spend $50,000 if his work would become public.

Others on the panel disagreed with Jacobs.

Dr. Michael Duggan, Professor at the University of Texas, asked, "Who are the patent proponents trying to protect?" Ideally he felt it was better for society if all ideas were open to all persons.

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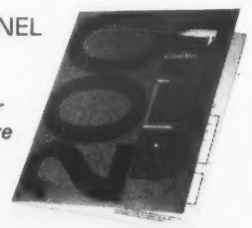

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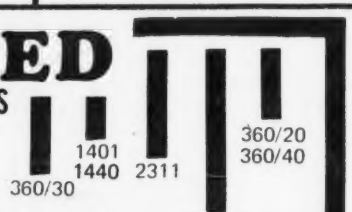

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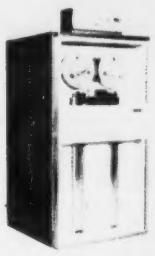

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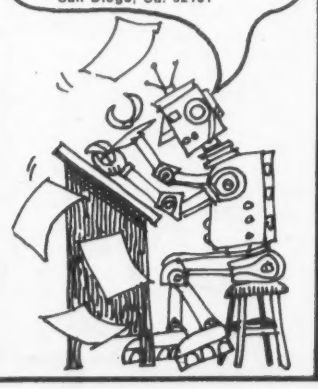

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Basic/Four Growing Slowly

MAI Shows Improvement, Cuts Losses

NEW YORK – Management Assistance, Inc. is continuing to cut its losses, with second quarter and six-month results showing improvement.

In the second quarter the firm lost $523,000, including special credits of $433,000, compared with a year-ago loss of $1.3 million including a special credit of $374,000.

Revenues showed a 19% increase, rising to $15.2 million from $12.8 million for the same 1972 quarter.

In the half-year ended March 31, the loss totaled $281,000, including special credits of $871,000, compared with a loss of $1.8 million and a credit of $785,000.

Revenues also rose to almost $31 million compared with $25.2 million in the year-ago period.

President Raymond P. Kurshan reiterated that slower than anticipated growth in revenues from sales of its Basic/Four system and delays in collection have continued to adversely affect the company's profit and cash positions.

During the six months, about 50% of the firm's revenues were derived from the marketing of Basic/Four and maintenance service furnished by Sorbus Inc., he said.

About a year ago, the two units contributed about 19% of total revenues.

MAI and the Continental Bank agreed to a deferral of one monthly payment due April 10 and have under consideration a rescheduling of other remaining payments in fiscal 1973, Kurshan said.

Sales by Genesis One Computer Corp., its domestic marketing subsidiary, have reduced the domestic residual value account on MAI's balance sheet to $538,487 compared with $3.2 million on Sept. 30, Kurshan noted.

He said he expects the account will be balanced in the third quarter. After that, MAI will be able to include domestic sales and related marketing and reconditioning expenses in its consolidated statement of operations.

REI First-Half Loss Includes Charge For Corporation S, Inventory Reserve

DALLAS – Recognition Equipment Inc.'s (REI) first quarter earnings were more than absorbed by a poor second quarter, which, with a charge for the loss of Corporation S and other items, resulted in a $458,000 loss in the six months as compared with restated earnings of $196,000 in the same 1972 period.

In the second quarter ending April 30, REI revenues rose to $10.5 million from $9.9 million, but the loss totaled $938,000 or 19 cents a share compared with restated earnings of $99,000 or 2 cents a share in the comparable year-ago quarter.

In preparation for the proposed merger with Corporation S, REI allocated $195,000 of Corporation S loss in the 1973 quarter, and restated a loss of $259,000 in the 1972 period.

In addition to the quarterly Corporation S loss, there was $638,000 in extraordinary items, including $450,000 for the establishment of an inventory reserve.

For the half, revenues declined slightly to $18 million from $18.6 million, while the firm's loss was $458,000 or 9 cents a share compared with restated earnings of $196,000 or 4 cents a share in the same 1972 period.

Special credits of $498,000 almost offset the $506,000 charge for the Corporation S loss in the half. The special credits resulted from a tax credit and gain on the sale of Docutel Corp. securities in the first quarter, less a $519,000 charge for establishment of reserve with respect to investment in Datacraft Corp. in 1973.

A $2.2 million gain from the sale of Docutel securities will be recorded in the third quarter, the firm said.

As of April 30, the backlog excluding R&D contracts was up to $24 million from $13.2 million, but shipments during the first half declined to $4.9 million, down from $8.8 million a year earlier.

CMC Shows First Period Profit

SANTA MONICA, Calif. – Computer Machinery Corp. continued its profitability started in the fourth quarter of 1972, with earnings of $386,416 for the first quarter ended March 31.

Including a $276,000 special credit, the $386,416 or 8 cents a share compared with a restated loss of $1.5 million or 31 cents a share in the same period last year.

Revenues soared to $10.7 million from $3.2 million in the comparable 1972 period. Of the total, sales accounted for $6.4 million, rental and service income $3.5 million and deferred revenues realized $772,250.

The company restated 1972 results to reflect adoption of a lower marketing deferral rate by which marketing costs are deferred equal to 2% of equipment's list price at the time an order is accepted and an additional 2% when the equipment is installed.

Previously, about 5% of the list price was deferred at the time an order was accepted.

The proposed acquisition of Cipher Data Products, Inc., a tape drive manufacturer, is expected to allow CMC to produce its products more economically, as "each CMC data entry system includes at least one tape transport as a major component," President Thomas L. Ringer said.

Informatics Reports Record Year

CANOGA PARK, Calif. – Informatics concluded the year ended March 31 with record earnings and a rise in revenues.

Earnings for the year totaled $650,000 or 43 cents a share compared with $424,000 or 28 cents in the year before, when a charge of $120,000 was made for discontinued operations.

Revenues rose to $18.8 million from $17.5 million in the 1972 period.

A "very strong" fourth quarter helped conclude the "best year in our history," according to President Walter F. Bauer.

The Mark IV file management system showed a 35% increase in revenues during the year, and was a major contributor to company revenues and profits, he said.

Mark IV and related products, together with the company's communications systems products, accounted for 42% of revenue during the year, up from 37% in 1972, he said.

Losses on a large fixed-price contract inhibited further profit gains, Bauer said, but he does not expect the contract to have any adverse effect on earnings during the next fiscal year.

The company is "virtually free of debt of any kind," Bauer said, adding that "sizable investments were made in new product development during the year."

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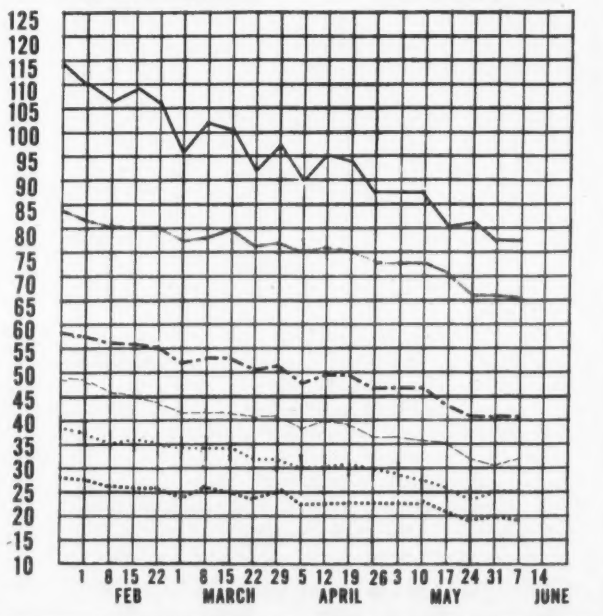
CLOSING PRICES THURSDAY, JUNE 7, 1973

EXCH		1973 RANGE (1)	CLOSE JUN 7 1973	WEEK NET CHNGE	WEEK PCT CHNGE
	SOFTWARE & EDP SERVICES				
O	ADVANCED COMP TECH	1- 2	1	0	0.0
A	APPLIED DATA RES.	2- 4	2	- 1/4	-11.1
O	APPLIED LOGIC	1- 3	1 1/2	+ 1/8	+9.0
N	AUTOMATIC DATA PROC	52- 94	57 3/4	+1 3/4	+3.1
O	BRANDON APPLIED SYST	1- 1	5/8	0	0.0
O	COMPUTER DIMENSIONS	2- 5	3 1/4	0	0.0
O	COMPUTER DYNAMICS	1- 2	5/8	0	0.0
O	COMPUTER NETWORK	1- 5	1 1/2	0	0.0
N	COMPUTER SCIENCES	2- 6	2 3/4	+ 1/8	+4.7
O	COMPUTER TASK GROUP	1- 2	1 3/4	+ 1/4	+16.6
O	COMPUTER TECHNOLOGY	1- 3	1	0	0.0
O	COMPUTER USAGE	4- 9	5 1/8	+ 1/2	+10.8
O	COMRESS	1- 2	1/4	+ 1/8	+100.0
O	COMSHARE	4- 9	4 3/4	0	0.0
N	CORDURA CORP	6- 15	5 3/4	- 1/8	-2.1
O	DATATAB	2- 4	1 3/4	0	0.0
O	EDP RESOURCES	1- 3	1	0	0.0
A	ELECT COMP PROG	1- 2	1 1/2	+ 3/8	+33.3
N	ELECTRONIC DATA SYS.	35- 56	35 7/8	-1 7/8	-4.9
O	INFORMATICS	2- 6	2 7/8	- 1/8	-4.1
O	I.O.A. DATA CORP	1- 1	5/8	0	0.0
O	KEANE ASSOCIATES	3- 4	3	0	0.0
O	KEYDATA CORP	7- 12	6 1/2	- 1/8	-1.8
O	LOGICON	4- 7	3 7/8	- 1/8	-3.1
A	MANAGEMENT DATA	2- 5	1 3/4	0	0.0
O	NATIONAL CSS INC	8- 41	17 3/4	- 1/4	-1.3
O	NATIONAL INFO SRVCS	1- 2	1	0	0.0
P	ON LINE SYSTEMS INC	13- 17	12 3/4	- 3/4	-5.5
N	PLANNING RESEARCH	3- 7	2 3/4	+ 1/8	+4.7
O	PROGRAMMING METHODS	22- 24	22 1/4	- 1/2	-2.1
O	PROGRAMMING & SYS	1- 1	7/8	0	0.0
O	RAPIDATA INC	6- 24	6 1/2	+1	+18.1
O	SCIENTIFIC COMPUTERS	1- 2	1	0	0.0
O	SIMPLICITY COMPUTER	2- 4	3	+ 1/4	+9.0
O	TRS COMPUTER CENTERS	3- 4	2 3/4	0	0.0
O	TCC INC	1- 1	3/8	0	0.0
O	TYMSHARE INC	6- 12	6 5/8	- 3/8	-5.3
O	UNITED DATA CENTER	3- 6	4	0	0.0
N	UNIVERSITY COMPUTING	5- 11	6	+ 7/8	+17.0
A	URS SYSTEMS	4- 8	4 1/4	+ 1/4	+6.2
	PERIPHERALS & SUBSYSTEMS				
N	ADDRESSOGRAPH-MULT	12- 34	12 1/8	-1 3/8	-10.1
O	ADVANCED MEMORY SYS	5- 23	6 1/4	+ 1/4	+4.1
N	AMPEX CORP	4- 7	5 1/8	+1	+24.2
O	ANDERSON JACOBSON	3- 6	3 1/2	+ 1/4	+7.6
O	BEEHIVE MEDICAL ELEC	6- 10	6 3/4	- 1/4	-3.5
A	BOLT,BERANEK & NEW	6- 12	6	- 5/8	-9.4
N	BUNKER-RAMO	6- 18	9 3/4	- 1/4	-2.5
A	CALCOMP	5- 13	7 3/8	+ 1/8	+1.7
O	CAMBRIDGE MEMORIES	10- 15	9 1/2	- 1/4	-2.5
O	CENTRONICS DATA COMP	13- 28	16 1/4	-2 1/2	-13.3
O	CODEX CORP	9- 19	10	- 1/2	-4.7
O	COGNITRONICS	1- 3	1 1/2	+ 1/8	+9.0
O	COMPUTER COMMUN.	1- 4	1 1/8	- 1/4	-18.1
A	COMPUTER EQUIPMENT	2- 3	2 1/4	0	0.0
O	COMPUTER MACHINERY	6- 13	6 1/2	- 1/4	-3.7
O	COMPUTER TRANSCEIVER	2- 6	1 3/4	- 3/8	-17.6
N	CONRAC CORP	15- 32	15 3/4	- 5/8	-3.8
A	DATA PRODUCTS CORP	2- 4	3	+ 1/8	+4.3
O	DATA RECOGNITION	2- 3	1 1/2	0	0.0
O	DATA TECHNOLOGY	2- 5	2 5/8	0	0.0
O	DI/AN CONTROLS	2- 4	2 1/8	0	0.0
N	ELECTRONIC M & M	3- 6	3	- 1/8	-4.0
O	FABRI-TEK	3- 5	2 3/4	- 1/8	-4.3
O	GENERAL COMPUTER SYS	6- 9	6	- 1/4	-4.0
N	GENERAL ELECTRIC	56- 76	60 3/4	+1 1/4	+2.1
N	HAZELTINE CORP	5- 9	5 1/4	- 7/8	-14.2
O	INFOREX INC	9- 23	9 1/4	+ 1/2	+5.7
O	INFORMATION DISPLAYS	1- 2	5/8	- 1/8	-16.6
O	INFORMATION INTL INC	10- 15	10	- 1/4	-2.4
A	LUNDY ELECTRONICS	4- 9	4 1/8	0	0.0
O	MANAGEMENT ASSIST	1- 1	1/4	0	0.0
A	MILGO ELECTRONICS	15- 28	15 1/2	+ 1/4	+1.6
N	MOHAWK DATA SCI	4- 13	4 7/8	0	0.0
O	ODEC COMPUTER SYST.	2- 6	2 1/4	0	0.0
O	OPTICAL SCANNING	2- 7	3	0	0.0
O	PERTEC CORP	5- 8	5 1/2	- 1/8	-2.2
O	PHOTON	3- 7	3 3/4	0	0.0
A	POTTER INSTRUMENT	4- 9	3 5/8	- 1/4	-6.4
O	PRECISION INST.	2- 6	2 1/2	0	0.0
O	RECOGNITION EQUIP	4- 8	4 1/2	+ 1/2	+12.5
N	SANDERS ASSOCIATES	7- 18	7 5/8	- 3/8	-4.6
O	SCAN DATA	2- 6	1 5/8	- 1/8	-7.1
O	STORAGE TECHNOLOGY	12- 34	14	+1 3/4	+14.2
O	SYCOR INC	9- 14	11 1/2	- 1/2	-4.1
O	TALLY CORP.	2- 14	3 3/4	+ 1/8	+3.4
N	TEKTRONIX INC	30- 53	31	- 1/2	-1.5
N	TELEX	3- 6	3	0	0.0
O	WILTEK INC	10- 18	10 1/2	+ 1/2	+5.0
	SUPPLIES & ACCESSORIES				
O	BALTIMORE BUS FORMS	5- 9	6 1/4	- 1/4	-3.8
A	BARRY WRIGHT	6- 13	7 1/8	+ 3/8	+5.5
A	DATA DOCUMENTS	17- 22	17 1/8	-1 1/4	-6.8
O	DUPLEX PRODUCTS INC	7- 10	7 3/4	+ 1/4	+3.3
N	ENNIS BUS. FORMS	5- 8	5 1/2	+ 1/8	+2.3
O	GRAHAM MAGNETICS	10- 20	10 1/4	0	0.0
O	GRAPHIC CONTROLS	9- 12	8 7/8	+ 1/8	+1.4
N	3M COMPANY	78- 89	84 1/8	+1 3/8	+1.6
O	MOORE CORP LTD	53- 60	54 1/2	+ 1/4	+0.4
N	NASHUA CORP	42- 58	46 1/4	-1 1/4	-2.6
O	REYNOLDS & REYNOLD	40- 51	41 1/8	-2 7/8	-6.5
O	STANDARD REGISTER	14- 20	14 3/4	- 3/4	-4.8
O	TAB PRODUCTS CO	10- 23	10 1/2	-1	-8.6
N	UARCO	17- 23	17 5/8	- 1/2	-2.7
A	WABASH MAGNETICS	5- 7	5 1/8	- 3/8	-6.8
N	WALLACE BUS FORMS	18- 26	18	- 7/8	-4.6
	COMPUTER SYSTEMS				
N	BURROUGHS CORP	211-245	224 1/8	+2 3/4	+1.2
N	COLLINS RADIO	18- 26	18	-1 1/4	-6.4
N	CONTROL DATA CORP	35- 62	36 5/8	+ 5/8	+1.7
O	DATA GENERAL CORP	28-131	31 1/4	+2 1/2	+8.6
O	DIGITAL COMP CONTROL	2- 6	2 1/4	- 1/8	-5.2
N	DIGITAL EQUIPMENT	73-105	83 7/8	- 1/4	-0.2
N	ELECTRONIC ASSOC.	4- 9	4 5/8	- 1/2	-9.7
A	ELECTRONIC ENGINEER.	6- 11	7 1/8	+ 7/8	+14.0
N	FOXBORO	23- 32	27 1/8	+3 1/8	+13.0
O	GENERAL AUTOMATION	26- 55	28 1/2	- 3/4	-2.5
O	GRI COMPUTER CORP	1- 3	1	0	0.0
N	HEWLETT-PACKARD CO	74- 95	82 1/8	+ 7/8	+1.0
N	HONEYWELL INC	99-139	101 3/4	-1 1/4	-1.2
N	IBM	310-457	322	+7 1/4	+2.3
O	INTERDATA INC	7- 13	8 3/4	+ 1/2	+6.0
N	MEMOREX	2- 19	4 1/8	+ 1/8	+3.1
O	MICRODATA CORP	3- 10	2 3/4	- 3/4	-21.4
N	NCR	27- 35	34 1/2	+1 1/8	+3.3
N	RAYTHEON CO	25- 34	25 3/4	- 1/2	-1.9
N	SPERRY RAND	36- 50	39 1/4	+ 3/8	+0.9
A	SYSTEMS ENG. LABS	3- 8	2 7/8	- 1/8	-4.1
N	VARIAN ASSOCIATES	10- 20	12	0	0.0
N	WANG LABS.	13- 34	14 1/4	- 7/8	-5.7
N	XEROX CORP	141-169	153	+5 3/8	+3.6
	LEASING COMPANIES				
A	BOOTHE COMPUTER	1- 5	1 1/4	- 1/8	-9.0
O	BRESNAHAN COMP.	1- 2	2 1/8	0	0.0
O	COMDISCO INC	6- 17	6 1/8	-1 3/8	-18.3
O	COMMERCE GROUP CORP	3- 4	3 1/2	- 5/8	-15.1
O	COMPUTER EXCHANGE	1- 1	5/8	+ 1/8	+25.0
A	COMPUTER INVSTRS GRP	2- 8	2 5/8	- 3/8	-12.5
O	COMP. INSTALLATIONS	1- 2	1 1/8	0	0.0
N	DPF INC	5- 9	5 7/8	+ 1/4	+4.4
M	DATRONIC RENTAL	2- 3	2 1/8	- 1/8	-5.5
A	DCL INC	2- 3	1 1/2	0	0.0
A	DEARBORN-STORM	14- 26	14 1/2	- 1/2	-3.3
A	DPA, INC.	5- 8	5	- 1/4	-4.7
A	GRANITE MGT	2- 6	2 3/4	+ 1/8	+4.7
A	GREYHOUND COMPUTER	3- 6	3 7/8	+ 1/8	+3.3
A	ITEL	4- 12	5	- 1/8	-2.4
N	LEASCO CORP	9- 18	9 1/8	+ 1/8	+1.3
O	LEASPAC CORP	2- 8	1 7/8	+ 1/8	+7.1
O	LECTRO MGT INC	1- 2	1 1/4	0	0.0
A	ROCKWOOD COMPUTER	1- 3	1 1/8	- 1/8	-10.0
O	SYSTEMS CAPITAL	6- 15	6 1/4	0	0.0
N	U.S. LEASING	16- 36	16 3/8	-1 1/8	-6.4

EXCH: N=NEW YORK EXCHANGE; A=AMERICAN EXCHANGE
L=NATIONAL EXCHANGE; O=OVER-THE-COUNTER
P=PHIL-BALT-WASH
O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID
(1) TO NEAREST DOLLAR

COMPUTER STOCKS TRADING INDEX



Earnings Reports

ENNIS BUSINESS FORMS
Year Ended Feb. 28

	1973	1972
Shr Ernd	$.58	.....
Revenue	41,611,620	$41,380,076
Spec Chg	.....	d1,863,185
Earnings	1,424,123	(2,012,012)
3 Mo Shr	.16	.....
Revenue	10,623,222	10,010,935
Spec Chg	.....	d469,007
Earnings	385,438	(217,638)

d—From writeoff of investments and advances to affiliated companies and losses from sale of surplus equipment and assets of discontinued operations.

WABASH MAGNETICS
Three Months Ended March 31

	1973	1972
Shr Ernd	$.22	$.11
aRevenue	7,873,388	6,659,176
Earnings	385,635	192,486

a—From continuing operations.

COMPUTAX SERVICES
Six Months Ended April 1

	1973	1972
Shr Ernd	$.71	$.94
Revenue	11,500,183	10,272,947
Earnings	899,132	1,183,447

COMPUTER USAGE
Three Months Ended March 31

	1973	1972
Shr Ernd	$.22	$.11
Revenue	867,402	804,339
Tax Cred	89,643	38,500
Earnings	196,585	88,829
6 Mo Shr	.35	.16
Revenue	1,476,451	1,587,951
Tax Cred	139,268	57,500
Earnings	305,413	133,353

WAVETEK
Four Months Ended Jan. 20

	1973	1972
Shr Ernd	$.18	$.17
Revenue	2,272,653	1,715,019
Earnings	155,741	114,183

COMDISCO
Three Months Ended March 31

	1973	1972
Shr Ernd	$.25	$.12
Revenue	6,545,168	3,745,123
Earnings	308,753	127,320
6 Mo Shr	.50	.22
Revenue	11,831,247	6,516,711
Earnings	593,764	225,821

ELECTRONIC TABULATING
Three Months Ended March 31

	1973	1972
Shr Ernd	$.24	$.01
Revenue	557,517	411,862
Spec Item	100,000	.....
Earnings	141,051	6,839

TYMSHARE
Three Months Ended March 31

	1973	a1972
Shr Ernd	$.14	$.04
Revenue	5,383,237	3,585,556
Tax Cred	86,000	53,000
Earnings	421,333	130,177

a-Restated to reflect acquisition in January 1973 on a pooling-of-interests basis.

SANDERS ASSOCIATES
Three Months Ended April 27

	1973	1972
Shr Ernd	$.29	$.13
Revenue	43,914,000	40,538,000
Tax Cred	391,000	150,000
Earnings	1,318,000	572,000
9 Mo Shr	.75	.35
Revenue	125,703,000	106,695,000
Tax Cred	1,008,000	387000
Earnings	3,431,000	1,591,000

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